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A MONTHLY JOURNAL, DEVOTED TO THE ELEVATOR AND GRAIN INTERESTS.

PUBLISHED BY
Mitchell Bros. Company,
(INCORPORATED.)

Vol. I.

CHICAGO, ILLINOIS, SEPTEMBER 15, 1882.

No. 3.

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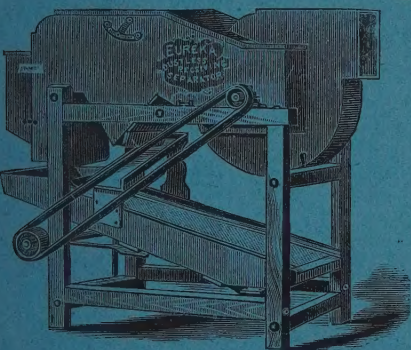
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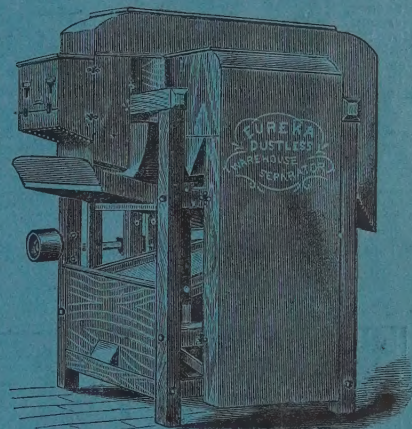
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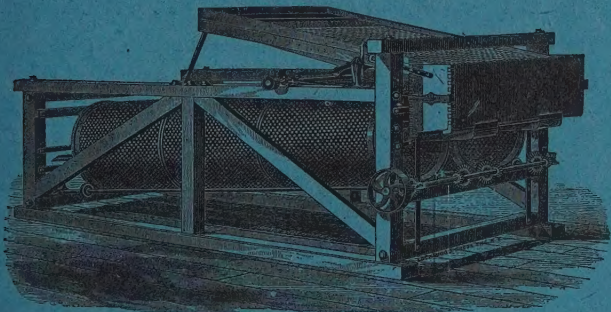
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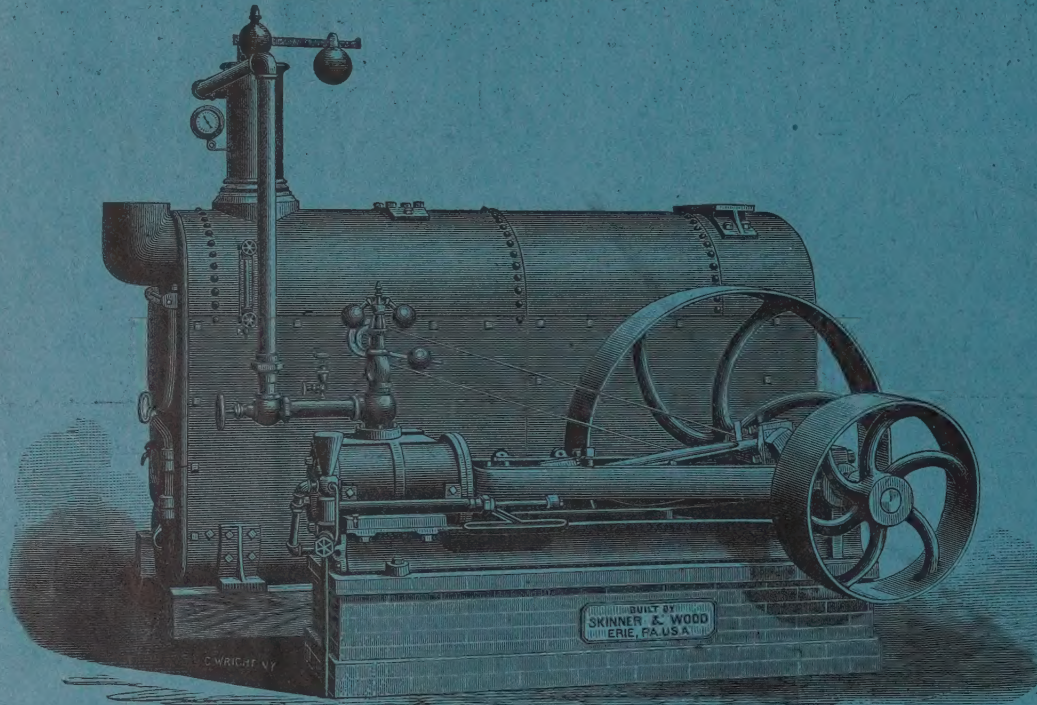
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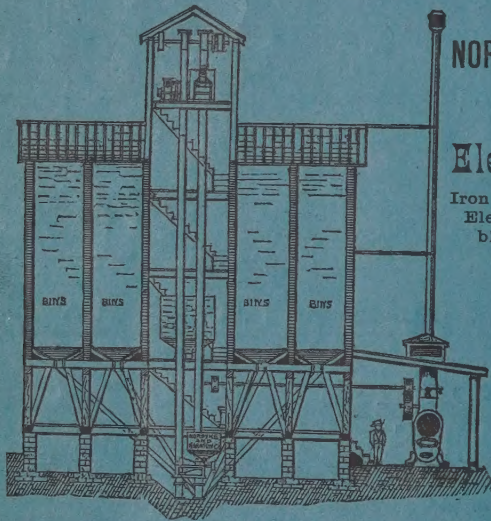
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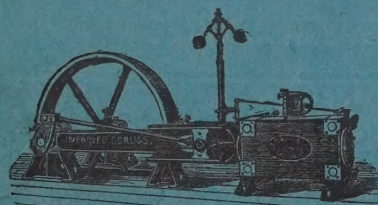
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ONE OF CHICAGO'S ELEVATORS.

The history and growth of Chicago, to one whose imagination can realize the facts of the past amidst the present loud-voiced surging of its vast tide of human life, must seem more like the representations of an Arabian tale than a truthful story. The generation has not yet wholly passed away who tell us of the few unpretentious dwellings, scattered over the marshy flat around Fort Dearborn, that, within the period of their own recollection, occupied the site of this great metropolis of the West. Among that motly group of pioneers if there was one whose pre-vision caught a dim glimpse of the changes which have since occurred, he might well have a place among the greatest of the ancient prophets. Chicago is now the railway centre of the West, and into her graneries the products of the Mississippi Valley and of the Northwest find their way, and their surplus grain seeks an outlet by means of her ships and railways, until by the handling of this large amount of cereals she has become the largest grain mart on the globe. The growth of her grain trade has kept equal pace with that of the vast territory that supplies her markets; and as the West has filled up with industrious millions she has outstripped all competitors until the great ports of the East and of Europe have been left behind in the race.

The elevator, which is peculiarly an American institution, is one of the most important factors of the grain trade, facilitating the handling of this product, and multiplying almost without limit the capacity and rapidity of its shipment. As a part of the plan of this journal we shall present to our readers from time to time illustrated descriptions of the most noted of the vast structures not only of Chicago, but of other cities.

Among the twenty-three principal Chicago elevators whose total capacity is somewhat more than 23,000,000 bushels, Messrs. Armour, Dole & Co. own five, which handle all the grain that is brought on the C., B. & Q. Railroad, viz.: "C," B. & Q. "A," with capacity of 1,250,000 bushels; "B," capacity 850,000 bushels; "C," capacity 1,750,000 bushels; "D," capacity 2,000,000, and

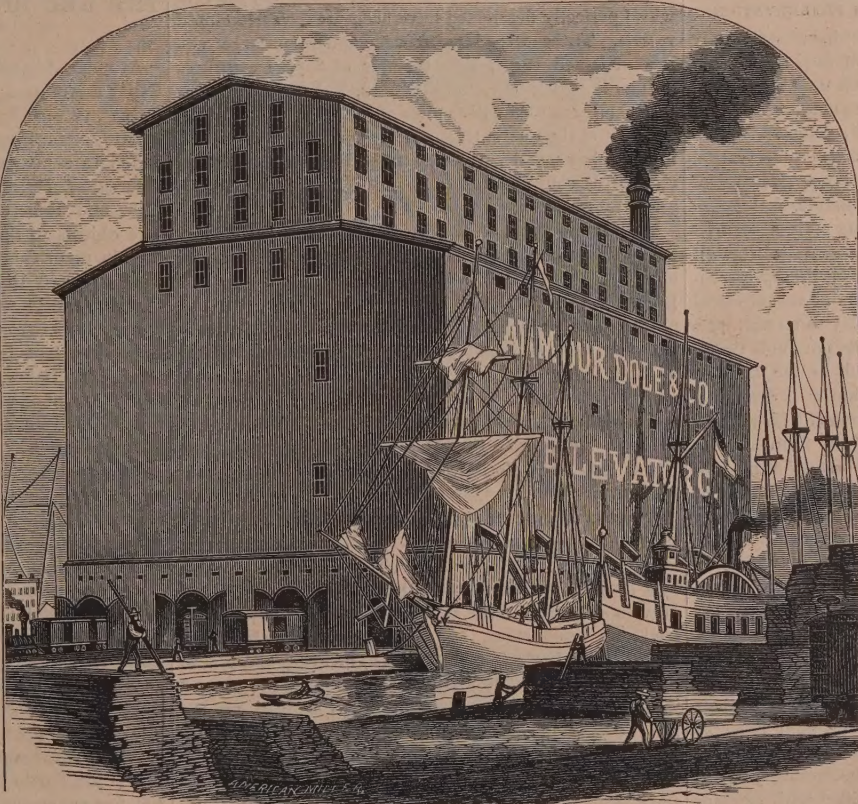
one built this year on Oakley and 16th streets, with a capacity of 1,000,000 bushels.

Elevator "C," of which the accompanying engraving is an accurate representation, is situated at the foot of Brown street, on the South Branch of Chicago River. The south end of the elevator faces the river, while

capacity, the foundations have not settled in the least. The superstructure is built of brick to the height of 24 feet, and the remainder of wood planks laid one upon another, and firmly spiked together. These plank walls are tiled on the outside with plates of slate to the top of the main building. A cupola 312 feet long and 35 feet wide surmounts the main structure, and makes its total height about 125 feet. The cupola is covered on the outside with iron. A spacious engine and boiler-house of brick on the south side of the building contains the motive power for driving the machinery. The engine is what is known as a propeller engine, and is 22 feet high. It has a 48-inch cylinder, by 42-inch stroke, and makes 54 revolutions per minute. The fly-wheel is 15 feet in diameter, and weighs 15 tons. The engine is capable of producing 700 horse-power, and was built by the Fishkill Landing Machine Co., of Fishkill-on-the-Hudson, N. Y. It is in every respect a splendid piece of mechanism, and is said to be inferior in size only to the engine at the city water-works. There are two boilers, each 16 feet long and 6 feet in diameter, built by J. Schneider & Co., of Chicago. There is also in the engine-room a Cope & Maxwell Fire-Pump with a 20-inch steam cylinder, and a 10-inch water cylinder, with a 20-inch stroke. Mr. O. H. Jewell is the engineer, and Mr. Wm. Mathisen his assistant, and to these gentlemen we are indebted for the details of this department. The office and other buildings are situated north of the main structure.

The elevator is entered on its north side by three tracks, one for loading and two for unloading. It has 10 receiving and 12 shipping elevators, but if necessary the third track with its six elevators can also be used for shipping. Sixteen cars can be unloaded at one time, the operation requiring the space of 20 minutes, making a total of 480 cars, or 192,000 bushels, in ten hours. The same amount can readily be shipped in the same time. All the discharging into vessels is at present done on the west side of the elevator, where there are seven discharge spouts, but if necessary the east side may be similarly employed.

Leaving the ground floor and ascending, the topmost story may be examined. At the south end of this story



ARMOUR, DOLE & CO.'S ELEVATOR "C."

slips of water about one hundred feet wide and extending to Twenty-second street, a distance of nearly a quarter of a mile, are on its east and west exposures. The space between the water slips on the east and west, and the elevator and Twenty-second street, is used as a track yard, and can easily store 350 cars.

The main elevator building is 312 feet long and 110 feet wide on the ground; and rests entirely on piles. These piles are cut off below the water line and capped with timber. Walls eight feet high, built of dimension stone, complete the foundation; and it is worthy of note that, although the elevator has been filled to its utmost

is a pulley 14 feet in diameter connecting with a pulley 8 feet in diameter on the ground floor by a belt made of rubber and canvas, 4 feet wide and 260 feet long. A line shaft extends the whole length of the building, and upon it are 10 pulleys for driving the receiving elevators. On each side is a shaft with six pulleys for driving the shipping elevators. From this story a magnificent view can be obtained of the whole of Chicago and surrounding country and lake for miles. The floor below this is occupied by 10 scales for weighing the grain received from the cars, and the floor under this is taken up by 12 similar scales for weighing the grain about to be shipped. But the part of the elevator that possesses the most interest is on the next floor below, or the "bin floor." Here are the openings of the 296 bins which the elevator contains. These bins vary in capacity from 5,000 to 6,000 bushels. They are all, with their hopper bottoms, 63 feet high, and are made of planks securely spiked together. At the lower end they assume the form of hoppers. The grain on being received for storage is elevated to the scales, where it is weighed and then deposited in the bins. On being shipped it is treated in a similar manner. The bins are all numbered, as are also the perfect forest of spouts leading to them from the elevators. The amount of grain which passes through these bins in a busy month is astonishing.

This immense structure was built in 1873-4 at a cost of about \$300,000. In the item of lumber, 4,000,000 feet were used. The machinery was designed by Mr. Wm. H. Lotz, of the firm of Baumann & Lotz, of Chicago, Ill., and great improvements in the machinery have been made since its erection, under their supervision. This firm also furnished the plans and superintended the erection of elevator "D."

[Translated for the AMERICAN ELEVATOR AND GRAIN TRADE.]

FRENCH METHODS OF PRESERVING AND STORING GRAIN.

CONDITIONS AND PRINCIPLES OF ITS PRESERVATION.

The modes of preserving wheat must have necessarily varied not only with the importance of food supply and the civilization of people, but also with the climate and topography of their countries. Let us observe first that Dutramel Du Monceau has said of the economical conditions upon which a good system of wheat preservation should be established: "Preserve a large quantity of wheat within as small a place as possible, as long as wanted; at low rate, without possibility of loss, secured from birds and insects, and lastly secured also from all stealth, even of the keeper in charge of this preservation." This being admitted, let us examine the physical conditions under which wheat must lay to be well preserved. Experience having taught, from remote times, that fruits and parts of animals dried in the sun and kept thereafter from dampness, could be preserved a long time; but that, left exposed to the air, without having been dessicated, they soon enter into fermentation. The thought naturally came up that if grain were submitted to the action of a summer sun, or of artificial heat, their preservation could be secured either in the open air or in closed vessels, where experience had also demonstrated that thus laid away, without previous dessication, either to be kept or to be out of the reach of destroying animals, they underwent alterations which rendered them unfit, in a short time, to the nourishment of man.

In all new wheat, in fact, there is a proportion of water of vegetation, more or less of it not combined with their elements, but the noxious influence of which must be guarded against as long as it has not been got out of them. If a bottle filled with wheat is hermetically sealed up, to take this wheat out from all contact with exterior air, vapor of water is soon perceived upon the inside of the bottle; the wheat gets mouldy and soon deteriorates. If new wheat, for awhile, is left in an open tub, or even piled upon the floor of a granary, the spontaneous heat which springs up in it is easily ascertained by a thrust of the hand in the piles, and a light dampness is also felt. If this beginning of fermentation is not arrested the wheat emits a vinous odor which soon passes to the sour, and finally it gets mouldy; therefore the preservation of new wheat harvested in our climate, whether packed, in close vessels, or exposed to the air in large heaps, is impossible, as long as you have not driven out all the water of vegetation or other water not combined, which is in it.

Dutramel Du Monceau has made a study to determine

the proportion of water of vegetation in the wheat; this proportion must, of course, vary with the atmospheric circumstances which have preceded or accompanied the harvest. Wheat two years old was submitted to the same trials as new wheat; they were first placed for 24 hours in a drying room heated to 47.5 (117° Fahr.), which is 10° higher than the temperature of the hottest summers, and last 1-32 or 0.03125 of their weight, the room was then heated to 63.8° (117° Fahr.); a portion of the same wheats was left in it 24 hours longer, and their weight decreased 1-16 or 0.0625. All these wheats were then sowed; all the new ones, dried or not dried, came up, but none of the old ones made their appearance. This shows that no fear need be entertained of a high dessication of the new wheats which are to be preserved, even if utilized for seeding in the year following. Mr. Doyace, having found it necessary, in order to expel all of the moisture in our wheats, which he estimates to be from 0.11 to 0.15 of their weight, to expose them during 24 hours to a temperature of 120° to 130° (centigr.), it is not by only one day of exposure to a summer sun that it can be hoped to drive out all this water of evaporation. At any rate, the simple comparison of the weight of the wheat before and after dessication will give the exact measure of the degree reached by the operation. A very important condition to be observed in the establishment of granaries, where the wheat well dessicated is to be left to itself, is to obtain a temperature in the heap which will remain as low as possible, and will not rise, in any case, above 10 to 12° (50 to 54° Fahr.), so that the larvæ of weevil which may adhere to or be mixed with it, being benumbed, will not be able to assume any development; for this insect, which resists a drying pushed up to 160° of heat (centigr.), multiplies so rapidly that its habits not being disturbed, and the surroundings so favorable, a large consumer, he can rapidly destroy the food supply, whatever be the size of it.

PRESERVATION OF WHEAT IN CLOSED VESSELS.

We have said that, in all times, small supplies of wheat perfectly dessicated have been preserved in closed vessels. These were large wooden coffers or large vessels of baked earth, like the jar of 25% Hectolitres (660 gall) in the Museum at Nîmes, and those of about 10 Hectolitres (265 galls.) piles of which have been discovered at the quarantine near Lyons. They were laid in cool places, and if the wheat had been well dried and cleaned it could be thus preserved a long time without alteration.

This is the mode of preservation that has been adopted by the administration of reserve supply for the Order of Malta. The metallic coffers used by them were laid in subterranean places in which the temperature did not vary very much. Mr. de Sainte Croix Molay, who had obtained a patent in 1827, had tried to have this method of preservation generally adopted; his recipients were of zinc, closed as hermetically as possible, and he obtained good results.

It was doubtless an important point to determine how wheat gets on in closed vessels where it is desired that it should be preserved, and in what condition it is found there after a certain length of time, as compared with its condition when thus laid away, and considering also the character of the hiding places. In order to solve this problem, Mr. the Count Dejean had, on the 5th of November, 1819, three cylindrical recipients made of lead run upon stone, and 0M.002 thick ($\frac{1}{4}$ inch), filled each with 80 hectolitres (2120 galls.) of grain and placed one on the floor of the rear of a dark shed, the second in a second story facing south, and the third on the floor of a cellar located under three ovens constantly used for military service, and in which the air was always warm and moist. In each of these three places three small recipients were also laid of one hectolitre (26½ galls.) each, similarly constructed and filled with wheat. After one year the wheat of 2d quality of 1819, from the smaller recipient in the rear of the shed presented an appearance of perfect preservation; it had a light milky odor, which disappeared after an airing of a few hours. The wheat of good quality of 1818, from the other small recipient on the second story had undergone no alteration. Lastly, the wheat of 1819 of first quality, from the small recipient in the cellar, was found unaltered, also, like the one on the second story. The metallic inside of the recipients had kept up all their brightness, while the greater part of their exterior surfaces had become oxidized. A few years after these wheats were found well preserved.

Mr. Dejean, on November 15th, 1819, had placed in the

cellar under the military ovens, three small leaden recipients of one hectolitre capacity and filled with weeviled wheat from the reserve supply stock of the city of Paris. One of these recipients, upon being opened in 1820, showed no other change in the wheat but the disappearance of a large portion of the weevils.

The sheets of lead of which the recipients were made weighed 25 kilog. per square meter; their cost was 0.90 fr. per kilog., and Mr. Dejean computed that their value would always remain 0.70 fr. per kilog.

NATURAL SUBTERRANEAN GRANARIES.

The caves or natural excavations presented by the rocky masses of some mountains, and the entry into which face north, free from fissures, layers and dampness, were utilized in Varro's time, in Thracia and Capadocia, under the name of *Hordeas Subterris*, as large preserving granaries for cereals and vegetable products previously dried in the sun. This writer records that wheat was preserved in them half a century. He instances the grot of Ambrosia, in which beans had been found in a good state of preservation after 120 years from the time they had been laid in it. Chinese historians tell us that a similar mode of preservation for wheat and rice had been in practice, long before Varro, in the mountainous portions of their country where such caves are still used for the same purpose. As they are being filled with grain the sides are carefully shielded with straw; when they are full, the entry is closed with a large stone, and the joints with wet clay and cut sods. Facts have well demonstrated in China that grains of fine quality which had been forgotten during centuries in such granaries, well situated, free from dampness, and with, doubtless, a temperature of 10° to 12° (50° to 54° Fahr.) had been recovered in a sound state of preservation.

[To be continued.]

THE RED RIVER AND LAKE SUPERIOR CANAL.

At noon, August 15, the Red River and Lake Superior Canal convention met at Duluth, Minn., in response to the call of the Chamber of Commerce of that city. The meetings continued through the following day and resulted in a permanent organization, with Judge O. P. Stearns, of Duluth, President, and D. G. Cash, of Duluth, and Robert Miller, of Fergus Falls, Secretaries. The objects of the association are to disseminate information upon the subject of a new waterway for traffic from the Red River of the North to the Great Lakes; its value and importance to the Nation; and to obtain an appropriation from Congress for its survey and prosecution. The facts in the case were presented at length by Gen. J. H. Baker, of Mankato, Minn., whose address, with those of several others, and the results of surveys by various routes, will be published in pamphlet form for distribution.

Two routes—the central, via. Lake Winnibegoshish, terminating at the mouth of Red Lake River, and the southern, via. Otter Tail Lake, terminating at Breckenridge, Minn.,—have been the principal ones so far surveyed. Another, to the North, by way of Lake Vermilion, is mentioned; and one still farther North, styled International, by way of Pigeon river, is said to have been the course of the Hudson Bay Company when the brave *voyageur* pushed his canoe up the Saskatchewan and neighboring streams to the waters of the far Northwest. The general estimate of distances to be traversed by water is about 380 miles, forty of which require canals. The rise from Fon du Lac to the highest level, that of the Turtle Lake chain, is about 700 feet, of which 600 feet are surmounted at Knife Falls and present the most difficult problems of the work for the engineers. This whole district is a meshwork of streams, marsh and lakes, and will furnish an abundant supply of water. The Government is constructing an eighteen foot dam at Lake Winnibegoshish for reservoir purposes, that will greatly aid the overflow of adjacent waters favorably to this enterprise. The expense is variously estimated at from four to ten million dollars. But it is stated that the largest estimate would not reach the cost of a double track railway over the same route, which, through the entire year, would carry not more than one-sixth of the amount that could be shipped by these waterways, used only during six and one-half months of the year. The comparative importance of water routes is shown in the fact that during the past ten years, crowded with rail-

way enterprise, 90 per cent. of the grain shipped from Chicago to Buffalo went by lake, and only ten per cent. by rail.

The resolutions of this convention, composed of representatives of the commercial bodies of the cities and towns of Minnesota and Dakota, set forth: That by improvements as above suggested, it is possible to make a useful waterway for crafts propelled by steam from the Great Lakes to the valleys of the Red, the Assiniboine, the Saskatchewan rivers and their tributaries, spreading through a region of arable land equal in extent to the entire Eastern and Middle States, already containing a large population, and producing 20,000,000 bushels of grain. That the effect of the cheap transportation thus obtained will be to hasten the occupation and enhance the value of these lands. That there will be brought, thereby, through the United States, the principal traffic of the Canadian Northwest, forming a powerful commercial link between the two peoples. Congress is urged to take the necessary steps of examination and survey; and the active co-operation of the legislative and commercial bodies of the adjacent states is earnestly requested. To one who can realize the gigantic strides by which, in the past few years, we have gained our present improved condition in human arts, this scheme will present no steps of greater measure, and will appear neither visionary or impracticable.

THE MURRAY CANAL.

A large and enthusiastic gathering of those interested in the new enterprise of constructing a canal uniting Lake Ontario with Bay of Quinte, occurred at Brighton, Ont., August 31st, to witness the turning of the first sod, and celebrate the formal opening of the work. The farm of Wm. Lovett, four miles from Brighton, on the shore of Presque Isle Bay, was the chosen point, where ample arrangements had been made of tables and seats enclosed in an arbor of evergreens, with all the usual accompaniments of flags and banners, and the abundant outpour of music and oration. By noon, it is said, 1,500 carriages lined the fences, and 10,000 people had assembled. At the dinner under the evergreens 3,000 guests were seated, representing the cities and towns of the country, as well as members of Parliament, and those whose business as contractors, etc., was more intimately involved. The honor was given of turning the first sod to Mrs. Joseph Keeler, widow of the member of Parliament to whose energy and perseverance, both in his official and business capacity, the present progress of the undertaking is mainly indebted. A beautifully designed silver-plated spade, ornamented with gold maple leaves, and having a maple handle bearing the inscription: "Presented to Mrs. Joseph Keeler by the citizens of Brighton and vicinity, on the occasion of turning the first sod on the Murray Canal," was used by the lady in this formal opening of the work. A little gold scraper received the first shovel-full of dirt, soon to be followed by the stonger and more effective improvements. The canal will occupy three years in construction, employing over 300 men and 400 teams. Regular work was commenced at once. Steam dredges will work from the Bay of Quinte and Presque Isle inward.

THE JULY WHEAT COMMITTEE.

The special committee appointed by the Board of Trade to establish a settling price for No. 2 spring wheat, for July delivery, has at last completed its labors. By its report, made Tuesday, Sept. 5, the value of the commodity in question on the last day of July, in the market, is fixed at \$1.35. The report of the committee is as follows:

To the President and Board of Directors of the Chicago Board of Trade.

GENTLEMEN:—The undersigned, a committee appointed to fix a settlement price for No. 2 spring wheat on the 31st of July last, beg to report that after a long and patient hearing of the evidence as it has been presented to the committee by the parties in interest, and in view of all the facts, and having reference to the duty of the seller to specifically fulfill his contract, do determine the settlement price of No. 2 spring wheat to be \$1.35 per bushel on the 31st day of July, 1882. * * * A full report of the testimony taken during the investigation is presented herewith. Respectfully submitted.

E. BUCKINGHAM, Chm'n.,
W. H. GOODMAN,
H. BAUSHER, JR.,
PORTUS B. WEARE,
FRED. S. JAMES.

Chicago, Sept. 4, 1882.

The firm of Holden & Timberlake, grain dealers at Cincinnati, suspended on August 31, with liabilities amounting to \$15,000.

NORTON & KEELER'S CHanneled SIEVE SEED CLEANERS.

Several years ago MESSRS. NORTON & KEELER, of LaCrosse, Wis., placed upon the market a Flax Seed cleaner which was at once received with favor by grain dealers and warehousemen. The success which this machine attained has induced them to perfect it in such a manner that it could be used for cleaning Timothy, Clover, Millet, Hungarian and other similar seeds. They announce that their perfected machine can now be recommended as strongly for the rapidity and perfection of its work on these seeds as it was formerly for flax

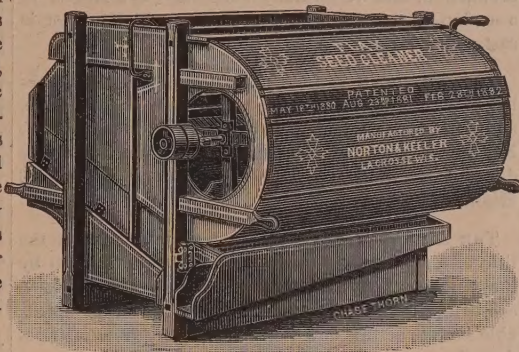


FIG. 1. FRONT VIEW.

seed alone. We need not attempt to argue, in this connection, the value of a seed cleaner, as every one handling any of the seeds named above can readily see that a successful machine will pay for itself in a very brief period. For instance, in cleaning flax seed, the handler will save the freight that he otherwise pays upon dirt; wheat and rye that may be mixed with it and which of course are classed as dirt in testing the flax seed; mustard and rape seed, which bring as much as flax seed in the market; screenings, which can be sold for feed, besides the enhanced price of seed to be sown.

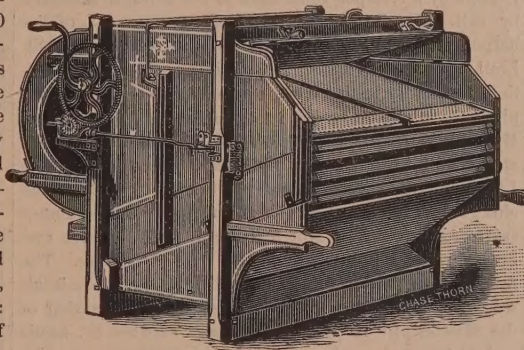


FIG. 2. REAR VIEW.

What is true of cleaning flax seed is also true of clover, timothy and other seeds, in a large measure.

Appreciating the difficulties that had previously stood in the way of applying the ordinary grain cleaning principles of screens and air currents to the successful cleansing of flax and similar seeds, the inventors of the machine herewith illustrated made a new departure, embodying their improvements in a different form for the screens, of the shoe, and a chaffing screen and an

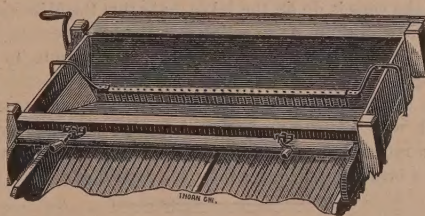


FIG. 3. AGITATOR.

agitator. Figure 1 shows a front view of the complete machine, and Figure 2 a rear view. The salient points will be best understood from the following description:

The zinc and wire of which the screens are made is all formed into channels which run lengthwise of the screen and parallel with the motion of the shoe when it is being vibrated. The shoe is suspended by cast-iron arms which project from its centre and rest upon sheaves or rollers which are fastened to the frame of the machine, thus allowing perfect ease of motion in a direct line, and the screens to work to their full capacity, which they can hardly do when the shoe is suspended

in the usual manner. The shoe is shaken by a cam upon the fan-shaft and has two shakes to each turn of the shaft, the shoe thus shaking from 360 to 400 times per minute. Upon each side of the shoe are bumpers of rubber which strike the frame of the machine as the shoe is vibrating and thus impart a sharp jar to the shoe and screens which it contains. The effect of this jar is not only to force the seed upon the screens through the side of the channel against which it is thrown by the jar, but also to loosen any material that may have become lodged in meshes of the opposite side of the channel, and the reverse when the jar is imparted to the opposite side of the shoe.

The manufacturers claim to obtain the following advantages from the above described arrangement: *First*, The forming of the screening material into channels largely increases the screening surface. *Second*, The speed of cleaning is increased by utilizing both form of screens, and the motion of the shoe to effect separations by forcing seeds through the meshes of screens, instead of relying upon it to drop through of its own weight. *Third*, Clogging of screens is in a great measure avoided. *Fourth*, The form of screens and manner of shaking them permits the use of screening material with finer meshes than can be used successfully in any other form, and thus the separations are much closer than they can otherwise be made.

The upper chaffing screen for Flax Seed is made of zinc formed into channels, as before described, but the perforations are only in the sides of the channels. Each perforation has a lip, which is directed toward the blast from the fan, and which serves to direct blast out through the perforation, and also to turn back upon and carry off from the screen any sticks, straw, etc., that would otherwise pass through it.

Figure 3 shows the agitator which is used in this machine to prevent clogging in the throat of the hopper, which remedies an annoyance long felt by those cleaning seeds containing sticks, straw, chaff, oats and other material that has a tendency to lodge in the opening at the bottom of the hopper and prevent the free flow of seed to the screens. The irons that carry the rake are attached to the shoe upon the outside of the machine and the rake moves with the shoe. The teeth of the rake play close in the opening at the bottom of the hopper and serve to turn any sticks, straw, etc., that would in its absence lodge across the opening, so that they lie parallel with and readily pass through it, thus preventing clogging and at the same time giving an even feed.

The manufacturers have numerous testimonials as to the value of their machine for the purposes set forth. They warrant their No. 4 machine to clean flax seed down to five per cent. or less of dirt at the rate of 100 bushels per hour, and down to about one per cent. at the rate of from 40 to 80 bushels per hour. In addition to the efficient work of the machine, it is sold by the manufacturers at a price which places it within the reach of all. Parties who wish to obtain further particulars of this interesting machine can do so by addressing MESSRS. NORTON & KEELER, at LaCrosse, Wis., who will be pleased to send descriptive circulars, samples of the machine's work, etc., and quote prices.

GRANARIES.

Grain is often damaged by storing it in a bin which is not properly constructed. When the grain is threshed directly from the field it goes through a "sweating" process, which, as heat is generated, may injure it, unless the bin is properly ventilated. To turn the grain by hand when in the bin is hard work, and, to obviate this ventilating, arrangements should be made for the thorough circulation of air. These ventilators may be constructed of strips of half-inch boards of convenient width, about four inches being usual. These are nailed together so as to form a triangular trough. The sides of the ventilator are bored full of small holes, and the ends coming through the sides of the bin are covered with a fine gauze. These ventilators are fitted into the bin, running from the front to the rear, with the open side downward. As the grain is poured in a considerable vacant space is left below the ventilator, in which the moist and warm air can accumulate and then pass out at the end of the ventilator. In this way, with two or three such ventilators in an average sized grain bin, even newly threshed buckwheat, the most "heating" of grains, may be stored without danger from over-heating.

General Items.

The grain elevator companies of Philadelphia have issued a circular calling attention to the fact that all deliveries of grain are weighed by sworn weighmasters at time of delivery, and in order to establish the accuracy of elevator weights of parcels, or cargoes, before vessels leave loading berths, shippers are required to superintend and check weight of all parcels as delivered, to which end every facility will be afforded them at elevators. No claims for short out-turn weight of cargoes or parcels of grain will be entertained or paid by the elevator companies.

In 1816 one bushel of corn would buy one pound of nails. In 1882 one bushel of corn would buy fifteen pounds of nails. In 1816 it took from twenty to eighty dozen of eggs to buy one bushel of salt. In 1882 one dozen eggs would do the same thing. In 1816 it required sixty-four bushels of barley to buy one yard of broadcloth. In 1882 five bushels of barley would do the business. In 1816 it required one bushel of wheat to purchase one yard of calico. In 1882 one bushel of wheat would buy thirty-five yards of a better article. In 1816 a pair of woolen blankets cost as much as a cow. In 1882 a cow would buy from six to twenty pairs of blankets superior in every way.

State prison grain sacks are now on exhibition at the San Francisco Produce Exchange. They are said to be of good quality and highly spoken of by the trade. There are now 100 looms in operation at San Quentin, with a capacity to make 80,000 sacks per day, at a cost of 8¢ for standard bags. "There are now two or more local city factories," says the San Francisco *Journal of Commerce*, "and there is room for more, as our annual consumption extends far into the millions, compelling the importation of many millions from Calcutta, Dundee, etc. Owing to an active demand from the interior, prices of grain sacks have of late undergone a very material rise, say 8@10c for all descriptions of jute and burlaps."

The South needs more elevators. "There is no doubt," says the Chicago *Tribune*, "that the people of the South planted and harvested a much larger grain crop this year than usual. The shortage last year and the high prices they were compelled to pay for breadstuffs and provisions prompted them to enlarge their grain product even at the possible diminution of their own peculiar staples. It will be a mistake, however, to look on this prospect as a complete reversal of the ordinary conditions of the South. There is no likelihood that there will be a surplus over home consumption in that section. Outside of Texas and Northern Georgia, the South will have no grain to sell. The absence of graineries and the attraction of good prices may induce the producers to put some of their stuff on the market for export early in the season, but there is reason to suspect that later in the season the South will be a large purchaser of grain and provisions, as usual."

An important meeting of the Illinois and Mississippi River and Canal Improvement Commission was held September 1, at Rock Island, Ill. There were present President J. M. Allen, of Geneseo; Vice President J. L. Camp, of Dixon; Secretary Edward Russell, of Davenport; Treasurer T. J. Robinson, of Rock Island; State Senator Whiting, of Tiskilwa; T. D. Brewster, of Peru; and W. C. Casson, representing William Durlay, of Hennepin—all members of the commission. In addition, several friends of the measure were present. The president and secretary, and Hon. L. D. Whiting were made a special committee to prepare for the use of the Commission a condensed statement of the statistics of commerce showing the advantages of the proposed canal. The secretary was instructed to correspond with the respective chairmen of the State political organizations of Illinois, soliciting them to advise county chairmen to see to it that on all tickets printed for use at the general election in November there shall be placed the copy of the form of vote upon the question of ceding the Illinois & Michigan Canal to the United States. It was decided to hold a full meeting of the Commission in Chicago in November, on call of the president, for the purpose of electing officers for the ensuing year. Letters were read during the meeting from Congressmen Henderson and Marsh, expressing interest in the objects sought for.

"KIND WORDS CAN NEVER DIE."

"THE AMERICAN ELEVATOR AND GRAIN TRADE."—This is the title of a new journal published by the Messrs. Mitchell Brothers, Chicago, publishers of the *American Miller*. In size and typographical style the new venture resembles the journal we have just named, and as it is devoted to the elevator and grain interests, it sticks as closely to its special texts as the *American Miller* does to that which it so ably expounds. The *AMERICAN ELEVATOR*'s first number is now before us. It reflects the highest credit on all connected with its production, and we cordially welcome it as a laborer in a section of the same field as that in which our lot is cast.—*The Miller*, (London, Eng.)

THE AMERICAN ELEVATOR AND GRAIN TRADE, published by Mitchell Bros. Co., Chicago, is on our table, and is a neat appearing and carefully edited journal. For buyers and handlers of the golden grain it is a very desirable publication.—*Journal of Commerce*, Duluth, Minn.

THE AMERICAN ELEVATOR AND GRAIN TRADE is the title of a new monthly journal published at Chicago by the Mitchell Bros. Company, proprietors of the *American Miller*. The first number speaks well for the probable success of this new venture.—*Millers' Gazette*, (London, Eng.)

THE RIVER ROUTE.

A New York paper has the following: "Mr. Bain, a St. Louis miller and shipper, was on the Produce Exchange yesterday, and among other subjects endeavored to draw attention to what he considers the short-sighted policy of the Eastern Trunk lines in making such high rates from St. Louis and other places west of Chicago as to divert the grain trade to the barge lines on the Mississippi from St. Louis to New Orleans, and thence to Europe by a cheaper route than to the Atlantic seaboard by rail. Mr. Bain says that the development of the barge transportation on the Mississippi River, between St. Louis and New Orleans, is attracting great public attention, especially in the West, and with the facilities multiplied there can be moved from the towns on the Upper Mississippi from 2,000,000 to 4,000,000 bushels per week at a cost, taking the river and ocean freight through to Liverpool, of several cents per bushel less than the charge for the same service through the direct routes eastward by way of North Atlantic ports. There are, however, some points which Mr. Bain overlooks. The first of these is that in any but mild winters there is always a portion of the year in which the navigation of the Mississippi is practically closed between St. Louis and Cairo, and another season in the summer when the water is so low in the two hundred miles of river between those two points that freight could not be transported except at very high rates. The barge lines could not be depended upon by shippers all the year round, and this being the case the shippers would not want to commit themselves to the barge lines for a portion of the year and then have the railroads advance freight on them in the portions of the year when they could not ship by barges. The barge lines might to some extent act as competitors to the railroads in the same way that the lake vessels do on the lakes, only that the Mississippi barges would not be so reliable as the lake vessels, and would not carry the grain by so direct a route to the foreign consuming markets in Europe. And yet it has been demonstrated by experience over and over again—as it was last summer—that the railroads can reduce their rates and deprive the lake vessels of almost their entire business whenever they see fit to do so.

The *Buenos Ayres Standard* says: "The magnificence of this year's maize crop is proving too much for our railways. This is the first year the River Plata could boast of what may be termed a decent crop of maize, and it is estimated that the crop available for export will reach 200,000 tons. Every steamer leaving port takes thousands of bags of this new staple, and to new European markets."

The organization for giving rating charters to vessels, known as Lloyd's, was organized in London in 1716, and was named after Lloyd's coffee house, a resort for all classes of persons connected with the shipping interest.

THE YIELD OF CORN.

The Cincinnati *Price Current*, noted for its statistical accuracy, presents an estimate of this year's crop of corn, founded on returns received from twelve of the largest corn growing States. These returns were from about 375 different counties and obtained during the last week in August. The weather recently has been very generally favorable to corn growth, and the improvement is evident. The crop is, however, some ten or fifteen days later than usual in most sections, and the danger to be feared in the North is from possible early frosts. The probabilities, this report states, are that the present crop will exceed that of last year by fifty per cent., and be in excess of that of any previous year. Official reports show that the corn crop of 1879 was 1,755,000,000 bushels. From this there was a decline of 28,000,000 bushels in 1880, and in 1881 of 560,000,000 bushels. The special reports referred to above estimate the yield of the twelve large corn-producing States at 1,295,000,000 bushels. This is an increase of about 400,000,000 over the yield of last year, but falls short 104,000,000 bushels of the crop of 1879. Estimates, however, from reliable sources from the rest of the country bring the prospective crop up to 1,800,000,000 bushels.

This unexpected result of careful investigation and estimates, not only dispelling the fears generally felt of a large deficiency in this year's yield of corn, but opening the possibility of a positive increase over all previous crops, is more than a surprise, and has already affected the grain market, causing a rapid decline of prices on the Chicago Exchange, and heavy offers to sell for future delivery.

The following table shows the estimates of the corn crop of the States named for the four years stated. The figures represent millions, and are taken from the Census Office Reports and those of the Agricultural Bureau, together with the estimates, above mentioned, of the *Price Current* for the present year:

	Estimate, 1882.	Crop, 1881.	Crop, 1880.	Crop, 1879.
Ohio.....	30	80	120	112
Michigan.....	26	25	35	32
Indiana.....	120	80	99	115
Illinois.....	230	177	240	326
Wisconsin.....	20	29	34	34
Minnesota.....	20	16	16	15
Iowa.....	165	173	260	275
Missouri.....	210	93	160	203
Kansas.....	125	76	106	106
Nebraska.....	100	59	60	65
Ten Western States.....	1,105	808	1,130	1,233
Kentucky.....	110	52	86	65
Tennessee.....	80	36	62	51
Texas.....	125	33	67	29
Other Southern States.....	300	184	252	226
Fourteen Southern States.....	605	305	468	371
Four Middle States.....	75	66	104	87
Six New England States.....	5	7	8	8
Other States and Territories.....	10	9	8	6
Aggregate crop.....	1,800	1,195	1,717	1,755

The owl, which easily digests meat, cannot digest bread or grain.

Always start an engine slowly, and allow it to come up to speed gradually.

The larger the steam cylinder and the faster the piston speed, the greater the necessity for much steam room.

Never admit the tallow to the cylinder until the engine is fairly under way and the cylinder drain cocks closed.

The best thing about wheat exports is the certainty that they bring a balance of gold back to pay for them.

After blowing down, allow the boiler to become cool before filling up again. Cold water pumped into hot boilers is very injurious from sudden contraction.

Belts which run loose will of course last much longer than those which must be drawn tightly to drive, tightness being evidence of overwork and disproportion.

The market for American cereals is widening. The government of Morocco has decided, in view of the present high price of breadstuffs in that kingdom, to reduce the import duties fifty per cent.

Late Patents.

Issued on August 8, 1882.

CAR STARTER.—Edward Amelius Jarvis Hamilton, Ontario, Canada, (no model.) No. 262,230. Filed May 17, 1882.

CAR STARTER.—Richards C. Smith, Baltimore, Md. (No model.) No. 262,251. Filed June 24, 1882.

DEVICE FOR CONVEYING GRAIN, ETC.—George Crehore, St. Louis, Mo. (No model.) No. 262,376. Filed October 11, 1881.

STOP MACHINE FOR GRAIN ELEVATORS.—John A. McLennan, Chicago, Ill. (No model.) No. 262,453. Filed April 2, 1881.

PROCESS OF AND APPARATUS FOR CLEANING GRAIN.—William L. Teter, Philadelphia, Pa., assignor to the Eclipse Improved Wheat Cleaning Machine Co., Camden, N. J. (No model.) No. 262,504. Filed October 7, 1881.

PROCESS OF AND APPARATUS FOR CLEANING GRAIN.—William L. Teter, Philadelphia, Pa. (No model.) No. 262,505. Filed December 23, 1881.

GRAIN WEIGHER AND REGISTER.—Charles J. M. Berenter, Flannigan, Ill. (No model.) No. 262,355. Filed April 15, 1882.

Issued on August 15, 1882.

FAN BLOWER.—John W. Collins, Chicago, Ill. (No model.) No. 262,642. Filed March 11, 1882.

ELEVATOR.—James Rigg, Chester, County of Chester, England. (No model.) No. 262,692. Filed May 5, 1882. Patented in England October 6, 1881, No. 4,345; in France April 3, 1882, No. 148,246, and in Belgium April 11, 1882, No. 57,579.

GRAIN AND SEED SAMPLER.—Sylvanus H. Stevens, Chicago, Ill. (No model.) No. 262,847. Filed April 6, 1882.

CAR STARTER.—Thomas Owens, Yonkers, N. Y. (No model.) No. 262,825. Filed April 21, 1882.

PLATFORM SCALE.—Frederick A. Rorder, Cincinnati Ohio, assignor of one-half to Alfred Springer. (No model.) No. 262,906. Filed April 10, 1882.

WAGON SCALE.—Frederick A. Rebko and Charles F. Rosenberg, Chicago, Ill. (No model.) No. 262,617. Filed March 24, 1882.

Issued on August 22, 1882.

GRAIN SEPARATOR.—John W. Hazelrigg, ElDora, Ill., assignor himself, Wesley T. Hazelrigg, Ves P. Husted, and Charles W. Hazelrigg, all of same place. (No Model.) No. 263,177. Filed April 24, 1882.

Issued on August 29, 1882.

CAR STARTER.—Charles A. Sulzman, Waterford, N. Y. (No model.) No. 263,363. Filed July 12, 1882.

CORN SHELLER.—Harvey Packer, Rock Falls, Ill. (No model.) No. 263,427. Filed May 9, 1882.

PROCESS OF TREATING GRAIN FOR SHIPMENT.—James J. Roche, Boston, assignor of one-half to William P. Greenough, Cambridge, Mass. (No specimens.) No. 263,590. Filed July 17, 1881.

Issued on September 5, 1882.

CORN SHELLER.—Harvey Parker, Rock Falls, Ill. (No model.) No. 263,304. Filed August 1, 1882.

ELEVATOR BUCKET ATTACHMENT.—George L. Lord, Waupaca, Wis. (No model.) No. 263,924. Filed April 4, 1882.

BLAST GOVERNOR FOR GRAIN CLEANERS.—Samuel W. Andrews and Lewis Godfrey, Knoxville, Tenn., assignors, by mesne assignments, of one-half to Sarah A. Vanderhoof; said Godfrey, in his own right and as Administrator of said Andrews, deceased, assignor to O. G. Vanderhoof, same place. No. 264,023. Filed August 8, 1878.

MACHINE FOR CLEANING GRAIN.—Augustus B. Kellogg, Buffalo, N. Y. (No model.) No. 263,913. Filed May 16, 1882.

STEAM SHOVEL.—Frederick C. Starke and Peter J. Crowley, Milwaukee, Wis. (No model.) No. 263,986. Filed June 24, 1882.

Experiments in acclimating Canadian barley and English wheat have generally proved unsatisfactory, and whenever attempted should only be on a limited scale. Our climate differs so much from their original home, that the first crop is apt to be a failure.

HAZARD OF THE CHICAGO ELEVATORS.

The *Investigator*, of this city, again returns to the subject of the fire hazard of the Chicago elevators. In a recent issue it says: "The recent great elevator fire at Buffalo and the subsequent burning of one or two smaller ones elsewhere, has awakened a wide spread inquiry among underwriters as to the extent of the hazard belonging to this class of risks. The condition of affairs among the grain elevators of this city, as discovered by Captain Bullwinkle of the Fire Insurance Patrol, and as detailed in these columns some time since, assumes new interest in the light of recent events. It was found by Captain Bullwinkle that in most of these elevators, some of them huge affairs, dust had been allowed to accumulate without hinderance, drippings of oil from the machinery had been allowed carelessly to mix with the dust and other waste, the watchmen did not attend to their duties, no safe or convenient means for the ascent of the firemen in case of fire to the tops of the buildings had been provided, and in many other particulars these buildings, carrying heavy insurance, were in a condition to invite conflagration. Although these facts were reported more than a month ago, it now appears that little or nothing has been done to improve the condition of the elevators, and the question of an advanced rate for carrying the risk on these buildings is accordingly becoming one of pressing importance. In their present condition, they are 'shaky' risks at current or any other rates."

TEN YEARS OF CEREAL PRODUCTION.

From 1870 to 1880 there was a steady increase in the production of grain in the United States, with only one or two slight fluctuations downward, which, however, were quickly regained; but in 1881 the grain crops suffered an enormous loss, due to unfavorable weather. As a matter of constant interest we present the following table of the acreage and production of grain for each year since 1871:

ACREAGE DEVOTED TO CEREAL CROPS IN THE UNITED STATES FOR THE PAST TEN YEARS.									
Years.	Wheat. Acres.	Corn. Acres.	Oats. Acres.	Rye. Acres.	Barley. Acres.	Wheat. Acres.	Corn. Acres.	Oats. Acres.	Rye. Acres.
1871	20,888,359	35,526,896	9,066,769	1,045,654	1,387,082	20,888,359	35,526,896	9,066,769	1,045,654
1872	22,171,676	30,197,148	9,751,760	1,150,355	1,387,082	22,171,676	30,197,148	9,751,760	1,150,355
1873	24,197,027	41,006,918	10,897,412	1,110,716	1,387,082	24,197,027	41,006,918	10,897,412	1,110,716
1874	24,381,512	44,841,371	11,915,075	1,359,788	1,789,902	24,381,512	44,841,371	11,915,075	1,359,788
1875	27,277,546	50,369,133	12,826,448	1,405,853	1,794,400	27,277,546	50,369,133	12,826,448	1,405,853
1876	32,108,500	51,585,000	13,176,593	1,622,700	1,794,400	32,108,500	51,585,000	13,176,593	1,622,700
1877	35,430,052	62,368,849	16,144,593	1,842,303	1,907,717	35,430,052	62,368,849	16,144,593	1,842,303
1878	37,986,717	62,317,842	16,187,977	1,767,611	1,843,339	37,986,717	62,317,842	16,187,977	1,767,611
1879	37,709,020	64,292,025	16,331,000	1,789,100	1,367,510	37,709,020	64,292,025	16,331,000	1,789,100
1880	37,709,020	64,292,025	16,331,000	1,789,100	1,367,510	37,709,020	64,292,025	16,331,000	1,789,100
1881	37,709,020	64,292,025	16,331,000	1,789,100	1,367,510	37,709,020	64,292,025	16,331,000	1,789,100

The foregoing figures present a concise but graphic picture of the development of grain production in the United States, while they, at the same time, forcibly point out the enormous decrease of last year. With an aggregate grain area in 1881 of 123,387,470 acres, we produced only 2,063,029,570 bushels, against 2,718,193,501 bushels from 120,926,286 acres in 1880, showing an actual decrease last year of 650,000,000 bushels of grain. The acreage of 1881 exceeded that of 1876 by over 30,000,000 acres, and yet the production of 1881 exceeded that of 1876 by only 200,000 bushels. The total area devoted to grain, increased from 68,280,197 acres in 1872 to 123,387,470 acres in 1881.

It is yet too early to give the correct statistics of grain production in 1882, but there is good reason for believing that when the total is summed up, the record of this year will fall but little, if any, short of 1880, and provided the corn crop turns out moderately well the total of all grains will be the largest ever yet produced. Of wheat the yield this year will probably foot up not less than

550,000,000 bushels, with a strong probability of its running above even these figures; while of oats and other cereals, excepting corn, the promise is for an abundant yield. The prospect for the corn crop steadily improves, and we may yet have a heavy yield, very nearly, if not quite, equaling the crop of 1879, the largest ever yet produced.

The average yield per acre of the various grain crops for the past ten years has been as follows:

PRODUCT.	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881
Corn, bus.	30.7	23.8	20.7	29.4	26.1	26.6	26.9	29.2	27.6	18.6
Wheat, bus.	11.9	12.7	12.3	11.0	10.4	13.9	13.1	13.8	13.1	10.1
Rye, bus.	14.1	13.1	13.4	13.0	13.8	14.9	15.9	14.5	13.9	11.5
Oats, bus.	30.1	27.7	22.0	29.7	24.0	31.6	31.4	28.7	25.8	24.7
Barley, bus.	19.2	23.1	20.6	20.6	21.9	21.3	23.6	24.0	24.5	20.9
Buckwheat, bus.	18.1	17.2	17.7	17.5	14.5	15.6	18.2	20.5	17.7	11.4
General average	20.7	19.6	17.8	20.0	18.4	20.6	21.5	21.8	20.4	16.2

As shown by these figures the general average yield per acre of all crops last year was 16.2 bushels, or 4.2 bushels less than in 1880, and, in fact, was the lowest average ever recorded; while for the present year the average of all will be unusually high, except corn, and even that promises to be quite good.

By grouping together the production of grain by geographical divisions, a good idea as to the proportion raised by each part of the country may be obtained. For this purpose the years 1871, 1877 and 1880 will be taken:

Geographical Divisions.	Aggregate Production—Bushels.		
	1871	1877	1880
New England States	943,400	1,174,800	1,062,232
Middle States	31,716,000	40,960,000	38,693,928
Southern States	31,371,000	41,870,000	55,301,686
Western States	145,386,000	245,814,346	833,799,635
Pacific States	19,330,000	28,875,000	59,692,397
Territories	1,967,000	5,500,000	10,000,000
Total	230,732,400	364,194,146	498,549,568

The New England States show but little change from 1871 to 1880; while in the Middle States there was a gain of 7,000,000 bushels; in the Southern States a gain of 24,000,000 bushels; in the Pacific States and Territories a gain of 48,000,000 bushels, and in the Western States an increase of 188,000,000 bushels. The three sections—New England, the South and the Middle States—do not produce enough wheat to supply their own wants; but of late there is a decided change regarding this in the South, and this section will this year produce a larger grain crop than ever before. Of corn, especially, the yield in the South will be very large, and will, to a considerable extent, counterbalance the shortage in other sections. Texas expects to gather 140,000,000 bushels of corn this year, against 33,000,000 bushels last year; while Tennessee and Kentucky will also produce heavy crops.—*R. H. Edmonds in Baltimore Journal of Commerce.*

BREAKING OF A BIG ELEVATOR SHAFT.

There was a loud report in the top story of one of the New York Central Railway grain elevators, at the foot of West Sixty-fifth street. The building shook to its foundations, and fire flew from the floors at the holes through which the big belt that runs the machinery passes. The elevator is the one known as A. It is 350 feet long and 145 feet high. Two powerful engines in the basement turn a large driving wheel, over which passes a rubber belt that also passes around a shafting wheel in the top story, nearly 150 feet above. The belt is 300 feet long, and weighs three tons. The shafting wheel which it turns weighs four tons, and connects with a horizontal shaft of cast steel, seven inches in diameter, that runs from one end of the big building to the other. It was the snapping of this shaft that caused the commotion of Tuesday. The shaft broke off at the hub of the shafting wheel, which was thrown off its centre with a violence that made the building tremble. The shaft itself nearly all along its length was bent and twisted. Fortunately, the belt slipped from the displaced wheel and further motion was stopped. Had the belt remained in place, the wheel would have been torn off, in which case it would have crushed through the floors to the basement. The great velocity with which the machinery was moving is shown by the fact that when the snapping of the shaft caused the belt to touch the side of the openings in the several floors through which it passed, the friction produced flame. Had the heavy wheel fallen through the building, great loss of life would have resulted, in addition to the damage to property.—*Sun.*

SHRINKAGE OF GRAIN.

Farmers rarely gain by holding on to their grain after it is fit for market, when the shrinkage is taken into account. Wheat from the time it is threshed will shrink two quarts to the bushel, or six per cent. in six months, in the most favorable circumstances. Hence it follows that ninety-four cents a bushel for wheat when first threshed in August, is as good, taking into account the shrinkage alone, as \$1 in the following February. Corn shrinks much more from the time it is husked. One hundred bushels of ears, as they come from the field in November, will be reduced to not far from eighty. So that forty cents a bushel for corn in the ear, as it comes from the field, is as good as fifty cents in March, shrinkage only being taken into account.

DANGER FROM BUCKETS.

"The constant increase in the number of great conflagrations in flour mills, grain elevators, and other large manufacturing establishments where elevator buckets are in use, (writes W. E. Stern to the *Miller's Journal*), leads me to the belief that this important means of conveyance is indirectly responsible for a great number of them. 'Out of sight, out of mind,' is a very old and familiar adage, and has a striking applicability to my theory that the elevator belt being carelessly allowed to sag permits the elevator bucket to drag on the back-board of the leg, generates a great heat by friction, which ultimately ignites the well-known highly combustible flour dust, and is the inception of many great conflagrations. It is not infrequent, also, that nails or screw-heads, accidentally protruding into the leg—perhaps carelessly driven there from the outside, or accidentally thrown out from the grain in its rapid movement—fasten themselves on the interior surface of the leg, become an object whereon a spark, as from the flint of a gunlock, may be easily generated by contact with the dipping edge of the bucket, and an explosion results. Elevator buckets of all kinds are no doubt liable to the danger noted." But seasonable precautions, the writer forgets, can make the elevator bucket perfectly safe in its operation.

THE TRANSPORTATION TAX.

BY STEPHEN B. DILLAYE.

With all our railroads and all our natural water courses, and all the easily attainable advantages of water course improvements, we are yet imposed upon by a system of railroad monopolies and taxation as onerous as ever disgraced civilization. In point of means everywhere is centre for exchanges, for markets, for traffic and for sale. We are no longer forced to go in pursuit of markets; they come to us wherever we are. They are at every farmer's gate. Energy and enterprise have opened up to us the markets of Liverpool and London, of Havre and Paris, of Stockholm and Brussels, of Bremen and Vienna, of China and Japan. But while the markets are open and the price is fair, the Kings of the Rail—the despots of the highways—impose a tribute and bar the gateways to commerce, to transportation, to sale and to traffic, unless the producer who sells and the consumer who buys will pay the tax they impose. Five thousand million dollars of railroad capital controls transportation. It has combined into corporate insolence to kill competition and to force the price of transportation to all the commodity will bear. Every farmer who sells his crop, is forced to do so in a way to pay tribute to dictation and to yield to the organized demand of monopolized power.

Five corporations, controlled by 100 capitalists, dictate to 50,000,000 people of the United States the taxes they shall pay as a condition of using the highways of the nation. They exercise a power no Congress would dare to assert. By a simple order they fix the price of transportation from San Francisco to New York. By a single command they raise the price of transporting grain from six cents a bushel to 40 cents a bushel from Chicago, from St. Louis to New York, and in like rate from all the great grain and produce depots of the country. By a single decree they impose a tax of \$10,000,000 on wheat, \$5,000,000 on corn. No taxes were ever so arbitrary, no taxes were ever so unjust. The taxes which led to the Revolution of 1776, were not a tithe of the taxes imposed on the grain growers of the United States. The

ship money which cost Charles I his head was the merest bagatelle of what is daily imposed by the Vanderbilts, the Goulds, the Huntingtons, and their associate corporate kings on the farmers of the Northwest. The Reign of Terror, and the saturnalia of blood and revenge, which characterized the French Revolution had not any stimulating cause so flagrant to inspire hate and awaken an outraged people to end oppression, as the railroad monopolists are daily imposing on the farmers. They charge "all the freight will bear." This is the declaration of Stanford Leland, the president of one of the roads built and paid for with the money and lands of the people. In this way \$60,000,000 is robbed from the agriculturists of the United States annually. Is proof demanded? Let me furnish it. One hundred and fifty millions of bushels of wheat, 90,000,000 bushels of corn, are now transported from the Valley of the Mississippi to Europe. One hundred and fifty million bushels are transported from the same section to be consumed in the Eastern States; this makes 390,000,000 bushels. The charge for transportation has averaged 17 cents a bushel from the farm or interior points to the lake or river markets, such as Chicago, Milwaukee, St. Louis, Duluth, Toledo. From these lake and river Western markets, the transportation to New York, Boston, Baltimore, Philadelphia, and other Atlantic ports the charges have averaged by railroad 22 to 35 cents more, and by lake and canal from 17 to 28.

The cost of transportation by railroad has not exceeded eight cents to the Western markets nor nine to the Eastern. Their charges were 39, leaving 22 cents as a tax on each farmer for each bushel of grain transported. The grain does not amount to one-half in bulk or weight of the produce and other products of the farm transported. Leaving the freight carried by the lake and canals to equal the produce and other articles, we can fairly estimate the charges on grain as covering the full traffic of the railroads. The excess of 22 cents per bushel over and above a fair profit, on 390,000,000 bushels would make the sum of \$87,800,000, or at half, say 11 cents, \$43,900,000 for a single year.

The distance of the interior grain markets from Chicago, from which nearly all freight estimates are made are as follows:

From.	To Chicago.		To Green Bay.		To New York, New Orleans.	
	Distance.	Cost.	Distance.	Cost.	Distance.	Cost.
St. Paul,	406	19.3	484	6.4	88	5 to 15
Winona,	306	18.4	366	4.8	87	5 to 15
La Crosse,	275	18.4	331	4.4	86	5 to 15
Dubuque,	288	17	371	3.6	88	5 to 15
Prairie Du Chien,	245	18	328	4.2	89	5 to 15
Savannah,	156	18	384	5.1	89	5 to 15
Fulton,	136	17.5	402	5.3	88½	5 to 15
Rock Island,	182	15	498	5.8	85	5 to 14
Burlington,	107	12	529	7	82	16

The table shows the amount which would be saved by the Fox and Wisconsin River improvement and also by the Mississippi improvement in transportation to Chicago, Green Bay, New York and New Orleans.

The rate of charges has been estimated on the following basis: Roads west of Chicago, 1½ mills per ton per mile on the main Trunk lines; on side and short lines from 3 cents to 80 cents per ton per mile. Trunk lines from all of the routes East from the Valley of the Mississippi and West of the Lakes, 7½ mills per ton per mile. Grain was moved during a part of 1881 at 7 cents per hundred pounds from Chicago and from St. Louis to the Atlantic cities, which would be 5¼ cents per bushel of wheat. The average for the year was 19 cents. The rate from St. Louis to New Orleans varies from 5 to 9 cents per bushel during high water.

But the generally received opinion and generally adopted scale of prices for transportation may be set down as follows:

	Per ton per mile.
By railroad, long route.....	5 to 6 mills
By railroad, short route.....	3 to 80 cents
By river, long route.....	1 to 2 mills
By river, short route.....	2 to 3 mills
By lake, long route.....	1 to 2 mills
By lake, short route.....	2 to 3 mills
By canal.....	3 to 4 mills
By ocean.....	1 to 2½ mills

Varying according to quantity to be carried and size of vessel.

It has been, and is capable of positive demonstration,

that freight can be carried at a profit on a pure freight railway for 500 miles at 4 mills per ton per mile, and for 1,000 miles at 3 mills per ton.

It has been proved by actual test that grain can be transported from St. Louis to New Orleans, 1,250 miles, by steam tugs and barges, one steam tug to five barges of 1,500 tons capacity, making 7,500 tons, for 17 cents and 49 mills per ton, which is equal to 7-10 of a mill per ton per mile, or 5¼ mills per bushel of wheat, from St. Louis to New Orleans. This is the cheapest transportation ever known; and assuming that the tugboats and steam barges get freight enough to pay the back expenses, it would save to the Mississippi valley and to all transporters enough every year to put and keep the Mississippi in perfect navigable order; for the price of transportation on that river not only regulates, but will for all time to come regulate, the price, to a large extent, on all of the great trunk railroad lines.

But assuming that the expenses of the tug and barges up the river have to be paid. The cost would be but 1½ cent per bushel; add to this expense of loading and unloading, at 1 cent per bushel, and grain could be put on shipboard from St. Louis, or any of the tributaries of the Mississippi, at New Orleans at 3½ cents per bushel. It can be transported at a profit by the shipload at 13 cents per bushel to Liverpool, the same to Havre, and at 14 to Bremen. Add insurance and wastage, and grain can be laid down in the European markets at 18 to 20 cents per bushel, thus saving to the farmer from 30 to 33 cents a bushel more than he now gets.

At present rates the farmers are paying to transportation nearly if not quite one-third the value of their cereal products; \$60,000,000 is a low estimate. The excess above a fair price and a fair profit is a tax upon every farmer of from two to three dollars per acre on every acre of land devoted to grains, to stock-raising and farm products.

What, then, is the remedy? Transportation must be cheapened. The charges are now exorbitant. It is easy to lessen them. Perfect the water courses. Start with the Fox and Wisconsin rivers, connecting the waters at Green Bay with those of the Mississippi at Prairie du Chien, thus giving the producers of Minnesota, Wisconsin and Iowa, perfect water courses to the Atlantic and New Orleans, or at New York, Baltimore and Philadelphia. Then complete the Rock Island and Hennepin Canal, connecting the waters of Lake Michigan with those of the Mississippi, and giving a double water course to the Atlantic through the lakes or through the rivers; improve the Illinois river; make the Ohio navigable from Cairo to Pittsburgh; build the great Kana-wha Canal, connecting the Mississippi and the Ohio with the Atlantic at Norfolk; improve the Tennessee and construct the Atlantic and Great Western Canal, uniting the waters of the Mississippi and Ohio and Tennessee with the ocean at Savannah; and, finally, construct a ship canal across Florida from the mouth of the Suwannee to St. Johns. Let this be done, for it can be accomplished; for the excess paid for transportation in any two years of existing prices over and above the cost and a fair profit will pay the cost.

It is bread to the mechanical consumer of the East; it is light to the millions who consume oil from the oil wells of Pennsylvania. In the last year the Standard oil company has extorted \$10,000,000 from the people through a monopoly of the transportation of oil and taxed it upon them to benefit a score of millionaires. It is comfort, life, and the enjoyment of his own toil by the farmer. There is but one way to remedy the outrage of extortionate taxation by railroads—by physical means—that is to improve the water courses. The Mississippi is the great national artery. It drains one-half the continent we possess. It is the highway to the ocean for 23,000,000 of our people. The Ohio, the Tennessee, the Illinois, the Wisconsin are tributaries. It is easy to make them all available. It will save two dollars a year on every acre of grain growing land in the United States. It will stop extortion; it will perfect the grandest system of water routes the world ever saw. It will make the railroads our servants; they are now our masters; to vote is to reign; the farmer has but to vote and combine to insure cheap transportation. It is his duty to himself to do it; it is his duty to the consumer that he does it. It is his duty to the country that he uses every influence he can control to end the dictation of railroad monopolists, and to put a stop to a system of taxation oppressive, unequal, unjust and unworthy of public or private support.

PLUGGING WHEAT.

Are there any of our readers who cannot enjoy the following from *Peck's Sun*?

One who reads about the honest farmer, and how he is cheated by the wicked monopolist, would hardly think that one of the hard handed toilers could be guilty of doing a wrong, or putting up a job on innocent wheat buyers. A correspondent of *THE SUN* was at Tama City, Iowa, a few days since, and was witness to a scene between a farmer and a wheat buyer named Jake Borton. Jake came along as the farmer was pouring the wheat from his sacks into the spout at the side of the elevator, and he noticed the wheat was "plugged," that is, that the top of a sack was all right, but the middle and bottom were the poorest kind. The following conversation ensued:

"Hello! my friend," said Jake. "Plugged your wheat did you?" The farmer paused in his labor and wiped his sun-burnt brow and replied, "I guess not. I don't think it is." "Don't think it is," yelled Jake. "Look at this, and look at this," he said, holding up both hands full of grain. Well, it does seem to be different grades," said the astonished farmer. "I don't see how it could have happened." "Your boys did it," suggested Jake. "No," he replied, "that cannot be, for I have always taught them to be straight, and I know them to be good honest boys." "Hired man?" again suggested the never tiring Jacob. "Y-a-s," said the hard handed son of toil, "it must have been him," and in went another sack of the mixed wheat. "Those hired men," mused Jake, "will soon ruin us all. Only yesterday Joe Smith socked a load of plugged wheat on me that his hired man had fixed up for my special benefit. Poor innocent Joe felt terrible about it. Last week Deacon Jones unloaded a fine load of barley. That is, it was fine at the top and bottom of the sacks. But his hired man had plugged the middle with stuff that would not sell for screenings. The good deacon would hardly believe the young man could do such a wicked thing. I have worn off my shirt sleeves, and my arms are calous to the elbow ramming them into sacks for nest eggs that those ungodly hired men have lain for me. Now and then the boys do it. Boys that walk not in the ways of their fathers, but get to roaming around Sundays, smoking cigars, drinking beer, and finally wind up in abusing the confidence of their honest fathers in dosing me unbeknown to them. Cases have occurred where the wives have actually stole away to the granary while their husbands were toiling their lives away and put up a load or two of mixed grain, but these cases are rare, and the main run of scoundrels are the hired men, imposing on the honest farmer. Now some folks would think that you fixed up this mess, but of course I know better. I have had experience, it's always the same story, and nine times out of ten any farmer will tell you that it is the hired man. We have got to put them down. Your fair name is at stake. See here, my friend, I will give that villainous valet of yours a lesson in common decency. I will dock you 25 cents on a bushel for this load, and you take it out of his wages." "I d-o-n-t think that will do," said the farmer, "he might kick." "Let him kick," replied Jake, "you send him to me, I'll settle his hash. You take it out and if he won't settle with me I'll refund. Here's your ticket, corner bank, drive on and let that other team up. I want to see what kind of a hired man he has got." The farmer drove off, and Jake, softly whistling, balanced his scales for the next deal, and pretty soon the farmer was seen sitting on a pile of grindstones in front of a store, figuring on a piece of shingle with red chalk, and it was more than likely he was figuring up how much he had made.

INFLUENCES ON GRAIN.

The grain markets everywhere, and in Europe, as well as at the West in this country, are governed by two influences: First the volume of receipts of grain at the principal Western markets, and second, the weather, which influences the foreign markets as much as it does the Western markets. The receipts at Western points, however, are the most prominent influence. If the receipts should increase next week, so as to indicate that the speculators will want to sell also. But if the receipts diminish, indicating that farmers are unwilling to sell, the speculators will want to buy. The weather also has an important influence on the volume of receipts, increasing them if it continues fair,

AN OREGON WHARF AND ELEVATOR.

The wharf, warehouse, etc., of the O. R. & N. Co., on the east side of the Willamette, at Albina, Oregon, is to be continuously extended for half a mile. A dry-dock is included in the plans, for the purpose of repairing deep water vessels of any tonnage. This dock is in course of construction. About 1500 laborers (with engineers, superintendent, foremen of gangs, etc.,) are employed with locomotives and dirt trains, loaded by machine scoop-shovels, in hauling earth from the bluff to fill next to the piling. The R. R. Co. own all the flats from the river to the bluff, including part of the latter, so that there will be no impediment in carrying the detail of the fills proposed along their line of track and river front. It is intended to fill the space (about 2000 feet wide) between the bluff and river front, to a grade above the highest floods. On this half-mile wharf a grain elevator is to be erected that will be commensurate with the present and future demands of the grain shipping trade. Mr. Mallory is the engineer and architect in charge, who was selected by Mr. Villard at the East. The structure will be ten stories high in the elevator part, and will stand on the piers next to the river. It will be wide enough for six trains of cars to stand side by side, and run into and out of the building on as many different lines of track. The wheat will be transported on the cars in bulk and the grain disposed of in the mode used in the elevators of the Atlantic side in grain storage and shipment.

CHARGES AT CHICAGO.

The following rates of commission charges adopted by the Board of Trade for receiving, selling and accounting for the various kinds of property herein named being just and reasonable, are declared to be the established rates of commissions governing the members of that association so far as relates to the receiving, selling, and accounting for the property named, viz:

For selling carload lots of wheat and rye in store, free on board cars or vessels, on track, delivered, or to be shipped from any other point, 1 cent per bushel.

For selling corn in store $\frac{1}{2}$ ¢ per bushel.

For selling corn by sample, 1¢ per bushel.

For selling car-load lots of oats, $\frac{1}{2}$ ¢ per bushel.

For selling car-load lots of barley, in store, 1¢ per bushel.

For selling car-load lots of barley, free on board cars or vessels, on track, delivered, or to be shipped from any other point, $\frac{1}{2}$ ¢ per bushel.

For selling canalboat loads of grain in store or afloat, or free on board vessels, $\frac{1}{2}$ ¢ per bushel.

For selling flax seed in bulk, 1 per cent.

For selling flax seed in bags, $\frac{1}{2}$ per cent.

For selling clover seed in car lots, 1 per cent.

For selling clover seed in less than car lots, $\frac{1}{2}$ per cent.

For selling timothy seed, $\frac{1}{2}$ per cent.

For selling other seeds, 2 per cent.

For selling dressed hogs in car lots, $\frac{1}{2}$ per cent.

For selling dressed hogs in less than car-load lots, not less than $\frac{1}{2}$ per cent. nor to exceed $\frac{2}{3}$ per cent.

For selling bran, shorts and millstuffs, \$3.50 per car.

For selling corn meal and mixed feed, \$5 per car.

For selling broom corn, $\frac{1}{4}$ ¢ per pound.

In addition to the above there shall be charged such legitimate expenses as are necessarily incurred in caring for the property and guarding the interests of both consignor and consignee. Nothing in this rule shall be construed as to prevent any special agreement between consignor and consignee by which a higher rate of commission may be charged in special cases.

The following schedule of commission is established for the government of members of the Board of Trade as the minimum rates of charges for the purchase and sale, or the purchase and shipment of the several commodities named, whether the property be purchased for an immediate or contracted for a future delivery; and whether the contract for purchase or sale be first in order in the transaction, to-wit:

In cases where the transaction is made by order or for account of parties who are not members of the association.

For the purchase and sale of property in the Chicago market:

On all kinds of grain in lots of 5,000 bushels or more, $\frac{1}{4}$ of 1 cent per bushel.

On lard in lots of 205 tierces or more, 10 cents per tierce.

On mess pork in lots of 250 barrels or more, 5 cents per barrel.

On other meats in lots of 50,000 pounds or more, $\frac{1}{2}$ ¢. In cases where the transaction is made by order or for account of parties who are members of the association the minimum charge shall be one-half the above rates, to-wit:

For the purchase and sale of property in the Chicago markets:

On all kinds of grain in lots of 5,000 bushels or more, $\frac{1}{2}$ ¢ per bushel.

On lard in lots of 250 tierces or more, 5 cents per tierce.

On mess pork in lots of 250 barrels or more, $\frac{2}{3}$ ¢ per barrel.

On other meats in lots of 50,000 pounds or more, $\frac{1}{4}$ of 1 per cent.

For the purchase and shipment by vessel cargo:

On wheat, rye, and barley, $\frac{1}{2}$ of 1 cent per bushel.

On other grains, $\frac{1}{4}$ of 1 cent per bushel.

For the purchase and shipment by rail:

On grain of all kinds, $\frac{1}{2}$ of 1 cent per bushel.

For the purchase and shipment of lard, mess pork, and all other meats, $\frac{1}{2}$ of 1 per cent.

For brokerage, where the name of the principal is given the day on which the transaction is made, and the broker thereafter ceases to be considered as the principal:

On all kinds of grain, 25 cents per 1,000 bushels.

On lard 1 cent per tierce.

On mess pork, $\frac{1}{2}$ of 1 cent per barrel.

On other meats, 3 cents per 1,000 pounds.

THE NICARAGUA CANAL.

The congressional enactment, incorporating the Maritime Canal Company of Nicaragua, presents matter of general interest to the public, whatever may be the final outcome. The name of Gen. Grant stands at the head of a large number of the most eminent capitalists of the country, who asked for this charter on the ground that this route is the most "economical and practicable" for a ship canal of any on the American Isthmus. In May, 1880, the Republic of Nicaragua made concessions to the Provisional Inter-oceanic Canal Society of the great value in the way of powers, privileges and land grants, which are secured by its charter to the company above referred to. By many it has been thought that so vast an undertaking, involving international rights, should be wholly in the hands of Government, and while it might be objected that private enterprise would be less expensive and more expeditious, a more general acceptance would be given to its finally being owned by the United States. But Nicaragua has vetoed this proposition in advance, on the ground that such concessions, held by our Government, would be equivalent to annexation. At the same time the fullest power of control of the intermediary company is conceded consistent with existing treaties.

In chartering this company the Government makes no guarantee of bonds or interest, but for twenty years after the opening of the canal guarantee to supplement, if required, its net earnings to make them not less than three per cent. per annum. But the amount expended for entire maintenance or repair of canal shall not exceed \$1,000,000 per annum, and the sum appropriated for deficiency as above shall in no event exceed \$75,000,000, and all surplus earnings over the running expenses must be used to keep the Government harmless. The tolls are limited to \$1.25 per ton displacement, which must be decreased if the canal earns over ten per cent. per annum, to a figure which will bring its net profits within that limit. The United States has the right to appoint one director, to whom, with one appointed by the Government of Nicaragua, as well as to the treasury department, the books of the company will always be open. The Government has also the right to take absolute possession of the canal, subject to the sovereignty of Nicaragua, at any time, on payment to the stockholders of five per cent. per annum during the period of holding. The free passage of Government vessels, troops, war munitions and mails, is a permanent privilege. These rights and guarantees will render the canal, when constructed, an American ship canal under American control.

Two hundred operatives will be employed in the new jute bagging factory at New Orleans.

Mechanical.

Extinguishing Fires with Steam.

The technical journals are again mooted the subject of the extinguishment of fires by means of steam, which appears to attract periodical attention. There can be no question that under certain circumstances, the application of steam for the purposes named will be vastly more useful and effective than that of any other agent. These circumstances may be briefly described to be where a building, or portion of a building is upon fire, and where the fire has not burned out to the air. Under these circumstances steam may render invaluable service, since, in most cases of this character, that fire can be speedily extinguished by its use with but a fraction of the loss to merchandise that invariably attends the use of water.

Friction in Steam Engines.

A large portion of the friction of engines is the result of tight cylinder packing. In setting out packing it should only be tight enough to keep the steam from passing. It is best to do this job by degrees, setting out the rings a little and then blocking the crosshead, and testing by allowing steam in the crane end of the cylinder. When no steam passes, the rings are tight enough. In cylinders that have run for some time it is impossible to make a cylinder tight without re boring. Care should be also exercised in making a complete revolution of the engine by hand after setting out the rings to see that the packing does not stick in any of the smaller portions of the cylinder. An engine that requires constant lubrication in the cylinder to prevent "squeaking," needs attention, as generally the rings will be found too tight, or the cylinder out of line.

Handling Grain Abroad.

Engineering gives the following description of the method of handling grain at the Millwall docks, London: The method of working grain adopted at the Millwall docks has proved so successful that it has been decided to greatly increase the needful appliances, and an order has just been given to the Midland Railway Carriage and Wagon company for a further 500 twenty ton wagons of the description previously supplied by them to this company. The leading feature of this system is the employment of railway wagons or bins, each of about twenty tons capacity, which are in fact traveling granaries. These receive the grain from the importing vessel, and are run back into sidings; upon application being received, the delivery of the grain to craft, van, or railway wagon is made at any convenient site. The wagons have numerous outlets on each side suitable for the sacking and weighing of the grain. The entire dock is thus available for receipt and delivery, instead of such operations being confined to the limited space of a granary.

Dishonesty in Purchasing Machinery.

Among the difficulties which makers of machinery, particularly of special machinery, have to encounter, is the evasive and dishonest attempts of customers in certain instances, to force a reduction in the price of machines purchased. When machinery is sold under a warranty, or is placed on trial, a favorable opportunity occurs for the practice of which we complain. This may be best illustrated by a case in point. A manufacturer of a special kind of machinery which was very heavy and expensive, agreed to send one of his machines from his works in another State to Chicago, and place it on trial in the manufactory of a firm desirous of purchasing it, the price being agreed upon in case the machinery should satisfactorily perform the work designed. The machine was forwarded and placed in position, and, as the manufacturer claims, worked according to contract, but to his surprise upon returning to his home he received a letter from the purchasers saying that the machine did not work to their satisfaction, and alleging some frivolous and groundless criticisms on its manner of working, but closing their letter with an offer to keep the machine at a reduction from the stipulated price. It at once became evident to the manufacturer that the purchasers were trying to force him to reduce the price by this subterfuge, they evidently thinking that the maker, rather than lose the freight on the machine, would allow

a reduction. However, in this particular case, we are happy to say, the manufacturer being a man of mettle, would not suffer an imposition, and much to the surprise of the would-be purchasers, insisted upon taking his machine away. It is true that he lost some money by the operation, but he had the satisfaction of knowing that he had not been bulldozed into making a concession against his will.

Accidents to Workmen.

Carelessness and ignorance are the two great promoting causes of most accidents, and the accidents that arise from what are considered inevitable causes are few. It is a wonder, not that so many accidents through carelessness do ensue, but that there are not more of them. Go into the workshops of the country and it will be found that scarcely a day passes but some workman risks being maimed or killed by his careless movements about the machinery. Men soon accustom themselves to move about works filled with machinery in the most reckless and careless manner, evidently unmindful that at any moment their clothing may become entangled in it, and before they could be extricated the loss of a limb or some disfigurement of their person would ensue. It is estimated that during the last ten years fully half a million people in England alone lost their lives from accidental causes in mines, on railroads, and in factories. Some writers claim that the loss has been double that number. We have not at hand the estimated loss of life from the same causes in this country, but while it is doubtful if the aggregate loss is as great as England, the actual figures, were they known, would be sufficiently startling to call for a careful consideration of the causes of this great destruction of human life, and the remedy therefor, if any there be.

Lacing a Belt.

An expert gives the following in regard to lacing a belt: There are many ways of making a lace joint or sewing a belt. I have used the following for several years with the most satisfactory success, and I unhesitatingly recommend it as the best: Suppose your belt is 8 inches wide, punch your holes with a small belt-punch (not larger than 3/16 in. diameter) beginning at 3/8 inch from the edge and 1/2 inch from the end, making the holes 3/4 of an inch apart from center to center; this will give you 11 holes; let the holes in either end of the belt be exactly opposite, each to each; now place your belt (hair side to the pulley) in position and with a lace thong, not to exceed in width the diameter of the holes, cut from a good thin side of lace leather, begin at one edge to sew your belt in just exactly the same manner you would lace your shoe, drawing the ends well together at each stitch; having worked across the belt, secure the last edge with one end of the thong by sewing over and over, and repeat the operation to the place of beginning, securing the ends of your thong by inserting them in leading holes made with an awl. This joint I have used with the most gratifying results upon circular saws, molding machines, and upright shaping machines; it works smoother over the pulley than any other joint I have ever seen used.

Safety Valves.

There are certain conditions essential to automatic safety valves of any sort, which conditions must be observed, and any valve not fulfilling them cannot be considered in the light of a safety valve. A safety valve should be placed either on top of the boiler or connected with the highest part of the steam space. It must be capable of discharging at a given pressure the greatest amount of steam which can be generated by the boiler in a unit of time; it must not allow the boiler pressure to accumulate beyond a fixed limit, and must close quickly, when the pressure falls by reason of its discharge below that point at which the valve is set to open. Every safety valve should be provided with a means of relieving the steam pressure in the boiler at any time, and of trying whether the valve moves freely in its seat. Weighting may be accomplished either by applying the weight directly, or by means of a lever. Coil springs are now very largely used for this purpose, and almost universally where the valve is weighted. Valve seats may be conical or flat. It is claimed for flat seated valves, that they afford greater lift, are the simplest in construction, most reliable in action, and the least liable to get out of order. A safety valve should be allowed to open

occasionally, and not be excessively overloaded, and at least once each day, when in use, the valve should be opened by hand, in order to insure its perfect action.

Location of the Boiler.

Mr. B. F. Allen says: Too little attention is paid to the location of the steam boiler. After everything else is provided for, the question comes up: Where shall we put the boiler? It is the most foolish thing an owner can do to put his boiler in some damp, dark cellar, or more frequently sub-cellar, or out-of-the-way place, where it's sure to be neglected, and special opportunities offered for its rapid corrosion. By all means set your boiler in a dry place outside your building, if possible, and in the light of day. Make a habit of visiting the boiler room frequently; confer with your engineer on matters concerning his department. It will pay. Show an intelligent appreciation of his work; see that your fire room is kept in order and the boiler bright and clean; on general principles, if the boiler indicates neglect externally, it is far worse internally, and apart from the great danger to which you may be exposed in using a foul boiler, means dollars, or their equivalent, shoveled into the furnaces, from which no return is made.

STORAGE RATES AT CHICAGO.

On all grain received in bulk and inspected in good condition, one and one-quarter (1 1/4) cents per bushel for the first ten days or part of same, and one-half (1/2) cent per bushel for each additional ten days or part of same, so long as it remains in good condition.

On condemned or unmerchantable grain, two cents per bushel for the first ten days or part of same, and one-half cent per bushel for each additional five days or part of same.

On and after the 15th day of November next, upon grains in good condition, storage will be at the foregoing rates, until four cents a bushel shall have accrued, after which no additional storage will be charged until the 15th day of April, 1879, so long as the grain remains in good condition.

Upon unsound grain, not in good condition, there will be no special rate for winter storage, but will be subject to the same charges as grain of the same quality received prior to the 15th of November.

No grain will be received in store until it has been inspected and graded by authorized inspectors, unless by special agreement.

SELLING WHEAT.

We do not believe that many of our Minnesota farmers ever made much money by wintering their grain over before selling it, but we do know of some who lost money by doing so. From a long and pretty close observation, as well as from personal experience, we are satisfied as a general rule farmers make the most money in disposing of their surplus crops as soon as convenient, say immediately after the threshing season, and for these reasons: There is always a boom in grain in the fall after harvesting. It is the season for the movement of crops. Speculators are ready then to make their investments. The prices are generally higher. The demand is greater. It is the natural part of the year to handle the grain, as the early winter is for selling and marketing the pork crop. A great many non-producers lay in their year's supplies of breadstuff during the fall. The shrinkage and the loss from vermin is saved. The immediate use of the money obtained from the sale of the grain is convenient and handy. Debts can be paid and interest money saved. Apprehensions and dangers from fire or any other accident is avoided. On the other hand, the only object in wintering wheat over is the prospect that the prices will rule higher in the spring than they are in the fall. In this the farmers are most always disappointed.—*Minneapolis Tribune.*

Horatio Seymour, who since his retirement from active political life has said many wise things very helpful to the right settlement of public questions, has struck a keynote in saying that "our canals should be as free as our rivers." We spend money on improving and maintaining the navigable channels of rivers, but do not on that account charge tolls for freight carried on them. The same should be true of our canals, and public sentiment will heartily endorse Governor Seymour's wise and timely declaration.

Legal Notes.

Option Contracts.

Contracts for the sale of property, to be delivered at a future time at the plaintiff's option, where it was not the intention of the parties that the property should be delivered either by consignment or the transfer of warehouse receipts, but that said contracts should be adjudged and settled by the payment of differences, are void.—*Melchert vs. American Union Telegraph Company*, United States Circuit Court, District of Iowa.—Quoted by *St. Louis Commercial Gazette*.

Mortgaging a Crop.

A mortgaged to B his unplanted crop, and when it was grown he converted it to his own use. B sued him for this conversion, *Collier vs. Frank*, and was defeated. The Supreme Court of Alabama, at the present session, in reviewing the judgment, said: "An equitable lien only was in A, and against any one who has notice of it, and who has converted the crop to his own use, he may maintain an action for the injury he has suffered and recover damages, or he may sue for the proceeds of the crop if it has been sold, as for money had and received for him."

Valid Option Contract.

Goods were sold to A by B, and in the contract it was agreed that the time of delivery was in the option of A. In an action upon certain promissory notes, given in the transaction by B to A, *Gregory vs. Wattowa*, the defense was set up that the contract was for a gambling transaction, and, therefore that no recovery could be had. The Supreme Court of Iowa, in June, through Judge Rothrock, decided that the contract was a valid one, as there was nothing to show that the goods were not to be delivered. Optional contracts which are void are such as do not contemplate the actual delivery of the commodity purchased, but rather contemplate that the subject of the contract is not intended to be delivered.

Shipping Contract.

H. & Co. shipped flour from Milwaukee to London under a contract which required the defendant to transport the flour by boat to Ludington, Mich., thence by rail to Portland; and thence by steamship to London. In an action to recover damages for delay of flour at Portland—*held*, that as the bills of lading constituted a through contract, it was the duty of the carrier to deliver the flour in London, and to do so within a reasonable time, and that it was as much its duty to seasonably provide vessels for ocean transportation as to furnish cars for the land carriage.—*Helliwell & Helliwell vs. Grand Trunk Railroad Company of Canada*, United States Circuit Court, Eastern District of Wisconsin.

Membership Rights in Stock Board.

Where the constitution and by-laws of an unincorporated association of brokers fixed a value upon the right of membership or seat in the board, and provided that upon the death of a member his membership or seat should be sold and the proceeds be used to satisfy any debts such member might owe to other members of the board, such provision is intended for the mutual protection of the members, and a third party claiming to be the equitable owner of such membership by reason of having advanced the money necessary to purchase it, the board having never had any notice of such claim, is not entitled to the proceeds of the sale of such membership, as against the claims of the board of directors against such deceased member.—*Thompson vs. Adams et al.*, Supreme Court of Pennsylvania.

Fixtures.

The machinery and attachments in question in a suit consisted of a steam boiler set in a brick arch which rested on a stone foundation let into the ground about two feet; an engine resting on a bed of brick masonry on a stone foundation let into the ground in like manner; line shafting adapted in length and adjustment to the shop, and connected with the engine by a band from the main wheel and securely fastened to the shop by hangers bolted to the joists and beams of the second floor; various other machinery, all securely fastened to the building and operated solely by the steam-power. De-

fendant built the shop and put in said machinery and attachments, intending to make them permanent acccessions to the freehold, as an improvement to his own property, for the purpose of carrying on a manufacturing business. The same were so constructed and annexed as to be adapted to the use to which the premises were devoted, and were actually so applied. *Held* that the whole of said machinery and attachments were fixtures.—*Taylor vs. Collins*, Supreme Court, Wisconsin.

Contract to Deliver.

Wheat was deposited by A with B, at A's risk; B operated a mill, to which was attached an elevator, and the grain was put into bins therein, in which there was other grain, and the miller used the grain in the elevator with his own. B, by the agreement, was to return wheat of a like quality and kind on demand, or pay its value. The miller failed, and A sued in replevin to recover his wheat, *Ledyard vs. Hibbard*, and recovered. The defendant appealed, and the Supreme Court of Michigan, in June, affirmed the judgment. Judge Cooley, in the opinion, said: "It was agreed on both sides that the 'owner' mentioned in the receipt must be understood to be the depositor—the plaintiff. As by the receipt the grain was declared to be at his risk for the time being, it must have continued to be at his risk until some act was afterward done by one party or the other to convert what at first was manifestly a bailment into a sale. The plaintiff could not be a creditor for the purchase price so long as he remained owner, and the receptors could not be debtors for the purchase price so long as the risks of accidental destruction remained upon the depositor. The depositor could convert the bailment into a sale by notifying the receptors of his election to receive the price fixed according to the terms of the contract; and the receptors, it is claimed, could convert it into a sale by consuming the wheat in the regular course of their business, as the parties must have understood it was likely they would do."

SPEED OF ELEVATORS.

BY R. JAMES ABERNATHEY.

A more illogical method of determining the speed of an elevator as now constructed could not well be devised than by the number of feet the belt should travel per minute. If it were logical and mechanical, there should be some uniformity in the matter; but there is none. The millwright who confines himself to ordinary mill work only, and uses pulleys ranging from twenty to twenty-four inches in diameter, fixes his speed at from about two hundred to two hundred and twenty-five feet per minute, which gives a speed to the elevator pulley of from thirty-five to forty revolutions, according to the variations in the number of feet. Some will insist on a few more feet, and some a few less; but the speed obtained, thirty-five to forty, is very good, and about what it should be. But the millwright who builds large grain elevators, and uses pulleys four and five feet in diameter, has a different speed for his belt. He runs his belt about twice as fast as the mill-builder, and, consequently, gives his pulley about the same speed as the other, and, of course, is about right. Both give their pulleys about the same number of revolutions, but vary widely in the number of feet their belts travel.

To illustrate the beauty of this mode of reckoning the speed of elevation, we will suppose a young millwright, not very well posted about speeds, who is about to put up a stand of elevators, using a twenty-inch pulley. He goes to one of those millwrights, accustomed to use large pulleys only in his business, for advice about the number of feet the belt ought to travel. Of course, he will give him the speed to which he is accustomed, say, four hundred and fifty feet. The young man bases his calculations on that speed, and runs his pulley about eighty-five revolutions. Well, if he were elevating hard grain, wheat or corn for instance, he might get along at that speed, but would probably have to line his elevator head with sheet iron to keep it from cutting out too rapidly, as it would have to constantly undergo a terrible thrashing from the very forcibly discharged grain. If, on the contrary, he were elevating chops from the burrs, or some other similar substance, he probably would find the most of it going down the elevator again, unless the cups were well constructed with the view of a rapid discharge; and even then much of it would be likely to go back. So much for the beauty of reckoning

the speed of elevators by the number of feet the belt should travel.

But for the well-known mechanical force, a perpendicular elevator could not be made to discharge. All elevators would have to be built slanting, or with a strong pitch forward, as was done years ago, before the true method was recognized and put in practice. By centrifugal force only can a perpendicular stand of elevators be made to discharge; and in determining the speed of elevators the laws controlling the discharged force must be recognized. The first law says that the centrifugal force generated by different sizes of pulleys, all making the same number of revolutions per minute, is in proportion to the size of the pulleys. Thus, a four foot pulley revolving thirty-five times per minute, would generate twice the force of a twenty-four inch pulley, making the same number of revolutions; and it would need just twice the force, as it would have twice the distance to throw its load; hence the reason why all classes of millwrights have their pulleys making about the same number of revolutions, although differing widely in the number of feet they run their belts. They recognize and obey the behests of the law without knowing it. The law says that whatever number of revolutions are necessary to make a twenty-inch pulley discharge properly, the same is necessary for a sixty-inch pulley; and they all give their pulleys about the same speed, but they arrive at it by reckoning from the number of feet the belt should travel per minute; rather a round-about way, to say the least.

The second law says that the centrifugal force generated by a given sized pulley running at different speeds, is in proportion to the square of its velocity. Thus, a twenty-inch pulley making seventy revolutions would have four times the force of the same sized pulley making thirty-five revolutions; and hence the reason of the difficulty the young man would get into by his elevator run at eighty-five; it would have six times the force, nearly, that it would if he ran it but thirty-five; and hence, also, the difficulty that would be experienced by running the elevator too slow. If a twenty-inch pulley were to run one-half the speed last named, or seventeen and one-half revolutions per minute, it would have but one-fourth the force of a pulley making thirty-five, which would be insufficient to discharge it; instead, it would roll over the pulley, and back down the leg.

The third law, which is merely confirmatory of the others, says the force generated by different sizes of pulleys making different revolutions, are to each other as the number of revolutions multiplied by the diameter of the pulley. We find by taking the number of feet to the minute theory, that a belt traveling two hundred feet will make a sixty-inch pulley revolve twelve and three-fourths times, nearly, (12.7326), while it will make a twenty-inch pulley revolve a little more than thirty-eight and nineteen-hundredths times, (38.197), which makes the centrifugal force of the two just equal, as will be found by multiplying each speed by its own pulley. This would give the sixty-inch pulley exactly the same force, and no more than the twenty-inch pulley, with about three times the distance to discharge. This is manifestly insufficient, and needs no additional argument to refute it. The material would necessarily fall back down the elevator, as the action of the gravitation would overcome the centrifugal force, and pull it downward long before it reached the point designated, or the discharge spout.

In elevators running from thirty-five to forty revolutions, material leaves the pulley on a tangent, about forty-five degrees from the top center, and would, of course, keep on in a straight line, (not a horizontal line) except for the action of gravitation, which disturbs the course, curves it downward, and lands it in the discharge spout as intended. The pulley can run slower than thirty-five revolutions, and there will be no perceptible difference in the result unless very much slower, when, of course, it would not work well, or not at all. But for grain especially a much greater speed than forty can be worked very successfully. The writer once put up three stands of elevators, and ran them with seventy revolutions, using a twenty-four inch pulley. It was done rather more from necessity, or expediency than choice. An eleven-inch cup was used, and the quantity raised was fifteen hundred bushels per hour, which taxed them to their utmost capacity. The grain began to leave the cups immediately after passing the top center, and with such force that it would probably have gone a distance of ten or twelve feet if there had been

no obstacle; but owing to the buckets being so full it scattered greatly, and a great deal of it dropped back down the leg. They, however, did their work, and are still doing it at this writing.

While under the same circumstances I would do the same thing again, still I would not advise any such speed. Forty-five revolutions should not be much exceeded for any purpose; not that a greater speed cannot be made to work; but the force, and constant wear and tear is unnecessarily great. The from thirty-five to forty rate of speed should be adhered to ordinarily. Meal or other material of less specific gravity than grain, will not stand as high a rate of speed, as it cannot get out of the way quick enough, and is liable to be carried back down; hence, for such, the standard speeds should be adhered to more closely. Sharp, purified middlings may be considered an exception. They are very heavy, and can be handled almost as easily as wheat.

The one chief lesson this article is intended to convey and the one to be remembered, is that the speed of an elevator has nothing to do with the travel of the belt in feet per minute. A good speed for all elevators, with any size of pulley, is from thirty-five to forty revolutions per minute; but there may be a moderate variation from these figures either way, with good results.

It is true in these calculations no account is taken of the space between pulley and mouth of discharge spout, that is, the width of the leg; consequently, if in a case of necessity, a very small (say a six-inch) pulley would have to be used, greater speed would be necessary to throw over the mouth of elevator leg, as it would probably be nearly as great as an eighteen-inch pulley elevator. A much higher rate of speed in so small a pulley would not be objectionable, as the force would not be great enough to do any harm; but in no case where it is possible to avoid it should extremely small pulleys be used.

THE HENNEPIN CANAL.

The Illinois river is now made navigable for boats drawing from six to seven feet of water, from LaSalle 100 miles south by two locks and dams, one of which is located at Henry and the other at Liverpool, or Copperas Creek, as it is sometimes called, between Havana and Beardstown. The Hennepin canal, the Illinois and Michigan canal and the Illinois river. The entire length of the Illinois river is about two hundred and twenty-five miles. The original programme was to make the Illinois river navigable for steamboats drawing at least six feet of water, the depth of water being seven feet. To do this it was said five locks and dams would have to be constructed, at an expense of \$400,000 each, or \$2,000,000 (two million dollars) for all. This estimate was made by General Wilson, of the United States engineers. It is now thought two more locks and dams will be sufficient. Hennepin is located eighteen miles below LaSalle, and the Illinois river, from this point to LaSalle, has now seven feet of water. The intention is that the Illinois and Michigan canal, when made a ship canal, shall have the same depth of water as the Illinois river now has from LaSalle to Liverpool. You will, therefore, readily see that when the Illinois and Michigan canal shall be made a ship or steamboat canal, and the improvement of the Illinois river shall be completed by the construction of two or three more locks and dams, as shall be finally found necessary, navigation will be complete from Chicago to New York, via Illinois and Michigan canal, the Illinois river, the Mississippi river, Gulf of Mexico and Atlantic ocean; or via the lakes, Erie canal, and Hudson river. By the new Welland canal, Lake Ontario and the St. Lawrence river, navigation to Europe is 480 miles less than by any other route. The locks in the Illinois river are remarkable for size, being 300 feet long and 75 feet in width, so as to take a whole fleet of boats at a single lockage. So much for the improvement of the Illinois river and the Illinois and Michigan canal.

The projected Hennepin canal is not intended for what is termed a ship canal, but for canal-boats drawing less than six feet of water, with locks sufficient to pass boats of 280 tons burden. The reason why no larger canal is contemplated, is because the Mississippi river above Rock Island is not reliable for boats drawing more than six feet of water. The length of the Hennepin is sixty-four miles. The feeder from Rock river, if constructed, will be thirty-eight miles. The whole expense for canal and feeder has been twice estimated—the first estimate was \$3,900,000—a little under, if my memory serves me; the second estimate was \$4,500,000.

There has been a great cry from Sterling lest the feeder for the canal would in a great measure use up Rock river. Most people seem to think the feeder would be a constantly flowing stream. The truth is, a canal is slack-water navigation, with no flow of water after the canal is once full, except in cases of lockage, and then in amount for each boat, a quantity containing about the same number of cubic feet that each boat contains, rather less than more. The Hennepin canal constructed would give a free and unobstructed water-way from St. Paul to New York city, or to Montreal and Europe.

In 1874 the United States Senate appointed a committee to travel over the country and ascertain what improvements in navigation could be made to facilitate and cheapen transportation. Among the improvements recommended by this committee was the construction of the Hennepin canal. The estimated cost of transport from St. Paul and intermediate places to Chicago was just one-half the then current rates by rail. A further statement was made by said committee that the entire cost of construction of the canal would be saved in a single year, and \$1,200,000 in addition, by moving the surplus crops of Iowa and Minnesota only.

EXPLOSION AND BURNING OF THE ERIE ELEVATOR.

The destruction of the Erie Elevator at Buffalo, N. Y., by fire, near mid-night, August 25, will be memorable for the simultaneous deadly explosion which occurred, due to grain dust set on fire in some unknown way, probably by means of exposed gaslights; while this accident will greatly extend the known field of action of this cause of fire hazard in handling grain, which has hitherto been supposed to belong especially to the flouring mill and flour dust. The suddenness of the catastrophe and the rapid action of the destructive forces thus set loose, baffling all human skill in its attempts to rescue life and property from their grasp, were fully illustrated in this disaster.

The Erie Elevator was built in the summer and early fall of 1879, for the New York, Lake Erie & Western Railway, to enable that company to handle the grain consigned to them for railway transportation. The work was done under the charge of W. A. Havens of Buffalo, N. Y., civil engineer of the Lehigh Company. The contracts were given to J. T. Moulton & Son, of Chicago, Ill., and the cost when completed was about \$250,000. The building, situated on the bank of the Buffalo river, was 100x75 feet on the ground and 120 feet high, and had a capacity of over 700,000 bushels. The engine house was built of brick and at some distance from the tower, with a partition wall between the engine and boiler. The elevator was the second largest structure of the kind in the city, and had special conveniences for loading cars, the storage bins being set back from the tower to make space for several lines of tracks.

At the time of the accident twelve men were at work at the elevator, and two cars were being unloaded. The propeller P. W. Blanchard had just been unloaded and had safely left the dock. Five unloaded cars were at the ends of the building. Assistant foreman Hansaner, who was in the office at the time, said to a reporter of the *News*: "It was just two minutes past eleven o'clock P. M. when I heard a dull rolling sound overhead; every timber of the building quivered, and I felt as if the ground under me was opening. As soon as I could collect my senses I dashed out of the office. Looking up I saw huge waves of flame leaping out of the top of the building. The shrieks of the poor unfortunate victims within the building could be plainly heard. I knew instantly there was no hope of escape for them." One of the shovellers at work at the time said he thought the boiler had exploded; on looking up he saw the roof of the elevator suddenly part in the middle, and huge volumes of flame then poured out of the building. In fact, the pressure of the burning gasses separated the roof cleanly in the middle, blowing one half on the dock and the other into the street, in the opposite direction. All efforts to quench the fire were useless. Five men lost their lives, four immediately; the fifth, after twelve hours of suffering from fearful mutilations. The names of the killed are, James H. Lee, Jr., John Kemp, Carl Auerbach, John C. Bonner the engineer, whose body was found blown into fragments and widely scattered, and Timothy Driscoll, whose death was delayed as stated above.

The elevator contained, at the time of the fire, 100,000

bushels of grain, valued at \$85,000; malt valued at \$6,000. The damage done to cars, docks, tracks and freight shed is estimated at \$15,000—making the sum, including the value of elevator, \$355,000, on which there is insurance of \$182,200. The engine, a vertical, built by the Pusey & Jones Co. of Wilmington, Del., is found not to be irreparably injured. The safe, when removed, was apparently uninjured. Mr. Havens has announced that the elevator will be re-built as soon as circumstances will permit.

FACTS ABOUT GRAIN.

Wheat is the prince of grains. It contains not only starch and other constituents common to all grains, but a large per cent. of gluten—the plastic principle of grain. So it yields a larger amount of nourishment than any other of the cereals. Animals who live on grain composed largely of starch are not well nourished; do not thrive well and long on starch alone, but do live and flourish where gluten is contained in considerable quantity. They do better still when they can get for food a mixture of all the constituents of the grains. These constituents exist in all, but not in the same proportions. Maize contains more oil; wheat more gluten. Some grains contain comparatively little oil or gluten. Oatmeal is obtained by kiln-drying the oats and removing the outer skin. Its flour is coarser than wheat flour. Its taste is peculiar, and not always liked. The Scotch oatmeal is coarser than the English, and is more highly valued. Barley is very little used in making bread. Pearl barley is the grain deprived of its husk, rounded and polished by attrition. Patent barley is pearl barley ground to the state of flour. Barley contains but very little gluten in a free state. Its plastic matter is albumen and casein. It cannot be made into vesiculated bread, but a bread is formed of it by mixing wheat flour with barley meal. It is less digestible, less palatable and less nutritious than wheaten bread. Barley water, so useful as a nutritive and demulcent drink in sickness, is prepared from pearl barley. Barley, under the influence of warmth and moisture, germinates, and the growth of the sprouts being checked by exposing the grain to heat in a kiln, is called malt. It contains diastase, and converts the starch into dextrine and sugar. The malt, infused in hot water, yields sweet wort, rich in sugar, that used for making beer. Rye, in form, somewhat resembles wheat. The center is starchy, and the grain contains some gluten and so may be made into vesiculated bread. It is the staple food of some sections of the earth, in which wheat will not grow. It has nearly the nutritious value of wheat. Its brown color and acid taste render it of much less value. Its relaxing effect upon the food canal renders it useful in constipation. Maize exists in many varieties. Pop-corn has the peculiar quality, on exposure to strong heat, of turning inside-out. All the varieties, deprived of its hull and broken, or coarsely ground, are known as hominy-samp, or grits, which is boiled and eaten like rice. It contains but little gluten and so is not fitted for bread, unless with wheat or rye. The brown bread of the Eastern States is a mixture of wheat, maize and rye meal. Maize meal is made into a porridge or mush. Maize has a peculiar flavor, much disliked by children. It contains a large amount of fat-forming matter, so that on keeping for some time and exposed to the warm air, it acquires a rancid taste. It contains a large percentage of starch, and a small one of plastic, fatty and mineral matter, and so is not a nutritious article of diet. To obtain a sufficient amount of nutriment a very large quantity must be eaten. Starch, eaten with plastic articles, as milk, meat and cheese, promotes growth and strength. It is easily digested, and is a proper aliment in disorders of the intestines, especially in diarrhoea and dysentery. Rice flour of the shops is usually so much adulterated, that for the sick, or for the well, rice, if needed in the form of flour, should be ground at home. Boiling rice is so apt to remove what little plastic matter it contains that steaming is the best way of cooking it.

A noteworthy occurrence is the purchase of wheat and corn in the same locality at the same price per bushel. At Rockville, Ind., a few days ago, both wheat and corn were selling at ninety cents per bushel.

The Bay Quinte barley will this year be light weight. From western New York the best and heaviest barley has heretofore been procured. Dry, hot weather as the grain was filling is the cause of failure this season.

Elevator News.

An elevator is wanted at Mandan, Dakota.

A new elevator is being built at Toledo, Ohio.

An elevator will soon be erected at Racine, Wis.

A new elevator is being built at Cape Vincent, N. Y. Kingston, Ont., will have another elevator next spring.

N. Failing & Co., of Macon, Ill., grain dealers, have sold out.

Comstock, Clark & Co. are building an elevator at Hudson, Wis.

The new elevator at Washburn, Dakota, has a capacity of 75,000 bushels.

The Union Depot Company are building a new elevator at Detroit, Mich.

Messrs. Wm. Baker & Son, of Bristol, Eng., are building a new elevator.

Collin County, Texas, has shipped nearly 800,000 bushels of grain this season.

G. W. Van Dusen & Co. are about to build a large elevator at Redfield, Dakota.

An elevator on the Chase plan is in process of construction at Marietta, Ohio.

The new elevator to be erected at Owen Sound, Ont. will have a capacity of 100,000 bushels.

The elevator at Jamestown, Dakota, is nearly completed, and will hold 75,000 bushels of grain.

John W. Hunter, of Morse, Kansas, expects to erect a combined mill and elevator at that point this fall.

The new Union Pacific elevator at Council Bluffs, Ia., costing \$200,000, has just been opened for business.

Mr. H. S. Sjöberg is making an addition to his elevator at Kirkhoven, Minn., of 50,000 bushel capacity.

Messrs. Fowler & Ingerson, lately operating the elevator at Nashville, Mich., have dissolved partnership.

At Sutton, Neb., R. A. Hawley is erecting an elevator, using machinery made by Thornburgh & Glessner, Chicago, Ill.

Thornburgh & Glessner, of Chicago, Ill., are busy, figuring on work for new elevators in Northern Minnesota and Dakota.

The Northwestern Elevator Company have under construction, at Hope, Dakota, an elevator with a capacity of 50,000 bushels.

A 25,000 bushel elevator is being built at Lapelle, Ind., for J. T. Ford & Co., by Nordyke & Marmon Co., of Indianapolis, Ind.

The new place Everest, Dakota, on the Manitoba Railroad, has two new elevators just constructed, each of a capacity of 30,000 bushels.

J. A. McLennan, architect, of Chicago, Ill., is letting contracts for three large elevators, one in Cincinnati, one in Toledo and one in Detroit.

Thornburgh & Glessner, of Chicago, Ill., have just shipped some of their specialties to be used in the new elevator at Tower City, Dakota.

The Barry elevator, at Ortonville, Minn., is 32x36 feet 22 feet high, will have a power house attached besides, and will be of 33,000 bushels capacity.

The elevator at Ijamsville, Ind., on the Wabash, St. Louis & Pacific Railroad, burned on the night of August 28th. Loss, \$11,000; no insurance.

There are twenty-two grain elevators in Chicago, with an aggregate storage capacity of 21,200,000 bushels, or an average of nearly 1,000,000 bushels each.

It is estimated that there will be 500,000 bushels of wheat marketed along the line of the Little Falls & Dakota Railroad in Pope Co., Minn., this fall.

The largest new elevator of Messrs. Cass, Cheney & House, at Dalrymple, Dakota, is supplied with buckets and bolts by Thornburgh & Glessner, of Chicago, Ill.

Messrs. Bauer & Van Sann, of Greene, Iowa, have just put in a 30-inch Kaestner Patent Portable Mill for grinding feed, made by Chas. Kaestner & Co., of Chicago, Ill.

The new elevators of F. P. Beach, Del Rey, Ill., J. Frazier, Tiffin, Ohio, and F. A. Ellis, Endicott, Neb., have machinery from Thornburgh & Glessner, Chicago, Ill.

H. Lindberg, while engaged in doing some work on September 6th, just above the new Bassett elevator at Minneapolis, was crushed to death by a rock falling on him.

A. Burntrager, Mulberry, Ind., is making some improvements in his warehouse at that place. Thornburgh & Glessner, of Chicago, Ill., furnish the necessary machinery.

W. S. Wheeler, of Ballston Spa, N. Y., has just added a 30-inch Kaestner Patent Portable Mill to his elevator and mill plant, made by Chas. Kaestner & Co., of Chicago, Ill.

The elevators of W. W. Cargill & Bros., Green Bay, Wis., La Crosse, Wis., Kindred and Flandreau, Dakota, contain machinery furnished by Thornburgh & Glessner, Chicago, Ill.

C. W. & T. D. Scofield have about completed the improvements on their elevators at St. Charles, Minn., and will be ready to receive all the grain that comes to them when it is threshed.

Thornburgh & Glessner, of Chicago, Ill., are furnishing machinery for the new elevators of the Minnesota & Dakota Elevator Co., at St. Johns, Minn., and Portland and Walcott, Dakota.

Messrs. Kellogg & Lang, of Hastings, Minn., are building an elevator near the depot of the Chicago, Milwaukee & St. Paul Railroad at Aberdeen, Dakota, 24x30 feet, and about 65 feet high.

The Wabasha Elevator Co., of Wabasha, Minn., are putting in a Kaestner Patent Portable Mill for feed grinding in their elevator at Durand, Wis., made by Charles Kaestner & Co., Chicago, Ill.

In Spain the grain crops are short. The government proposes to give relief by remitting the duties on flour and grain. Such a remission would open Spanish markets to American wheat.

The grain shipments from Greenwood, S. C., last year amounted to 65,000 bushels, netting a cash return of over \$25,000. The bulk of the grain was shipped over the Augusta & Knoxville Railroad.

A Union Elevator Company has been organized at Grand Forks, Dakota, with Alex. Griggs, president. Geo. Sherwood & Co., of St. Paul, Minn., secured the contract to build the elevator for \$12,500.

Levy & Dobson, of Cleburn, Texas, shipped 5,000 bushels of wheat in ten days, via the Gulf, Colorado & Santa Fe Railroad, direct to Florence, Italy. They were making up another 5,000 bushel shipment for Liverpool direct.

The Minnesota and Dakota Elevator Co. has about completed eleven or twelve new elevators and warehouses on the St. Paul, Minneapolis & Manitoba Railroad, each of which will have an average capacity of 30,000 bushels.

Mr. Jesse Hoyt, of New York city, a prominent business man largely interested in grain and railroad enterprises, died in that city, August 14th. Mr. Hoyt was a partner in the elevator firm of Angus Smith & Co., Milwaukee, Wis.

Thornburgh & Glessner, of Chicago, Ill., have recently shipped machinery for the new elevators of Messrs. Cargill & McMillen at Portland and Everest, Dakota. This firm owns elevators at Durbin, Dakota, and at other points in the Northwest.

As regards French wheat the result is already known. Maize is good in twenty-five departments and very good in two, as against good in seven departments only last year. Rye shows a similarly favorable contrast. Barley shows slighter improvement.

James Dunlap, of Mapleton, Dakota, is building a fine elevator to handle the large crop of grain raised in that vicinity. Thornburgh & Glessner, of Chicago, Ill., have the contract for the elevating and conveying machinery, belting, pulleys, shafting, etc.

The "President" flour mill and elevator at Bethalto, eight miles from Alton, Ill., owned by Jno. W. Kauffman, of St. Louis, Mo., was burned on the night of August 22d. The elevator contained 25,000 bushels of wheat which was an entire loss. The total loss was \$134,000, and the insurance \$60,000.

The new elevator of Messrs. Mills, Davidson & Co., recently erected at Jamestown, Dakota, on the Northern Pacific Railroad, and one of the finest in the Territory, was supplied with the Excelsior Elevator Buckets and Corrugated Belt Bolts by Thornburgh & Glessner, of Chicago, Ill., the manufacturers.

The London Times says: "Never during the time since these reports were collected has the harvest in the Northern hemisphere been so good all around. We usually had to report a deficiency either in Europe or America. This year there is absolutely none. The world has over an average harvest, and with such a harvest the year is likely to be one of cheap abundance."

Mr. Edwin Morris, of Mapleton, Dakota, one of the wealthiest farmers of that section, is building at Grafton, Dak., a large elevator to be of a capacity of 120,000 bushels. The latest improved machinery is to be supplied for it by Thornburgh & Glessner, of Chicago, Ill., who have the entire contract for the elevating and conveying machinery, pulleys, shafting, belts, boots, castings, etc.

J. T. Moulton & Son, of Chicago, Ill., are building by contract a 1,000,000 bushel elevator at Peoria, Ill., for the Peoria Union Elevator Co., to be known as "Union Elevator No. 2." The foundation will be completed about October 1st, and the entire building about February 1st. There will be eight elevators for receiving and eight for shipping purposes. The elevator will have a capacity to unload 300 cars, and load the same number per day. The engine is to be a "Corliss" 80x48 inches, with three boilers 66x160 inches. These, with pumps, heater and machinery of all kinds, are to be furnished by the Smith, Beggs & Rankin Machine Co., of St. Louis, Mo. J. Hancock, of Peoria, Ill., furnishes the lumber.

Fairbanks, Morse & Co., of Chicago, Ill., furnish the scales; the New York Gutta Percha and Rubber Co., Chas. Carleton & Co., of Chicago, agents, the belting and hose, and the Webster & Comstock Manufacturing Co., Chicago, Ill., the buckets.

Thos. E. Wandell, a young man, clerk of the Central Elevator Co. of St. Louis, Mo., on the evening of August 16th, fatally shot a youth of eighteen years of age, named John Mahler, at the depot of the St. Louis & San Francisco railroad. Mahler was one of the young thieves engaged in stealing grain, who, having been deprived of their stolen property, set upon and severely beat young Wandell.

A new elevator is about to be erected at Hamilton, Dakota, on the line of the St. Paul, Minneapolis & Manitoba Railroad by the Hamilton Elevator Company, composed of the prominent men who own the town-site of Hamilton. The building, though moderate in dimensions, will be first-class in every particular. Thornburgh & Glessner, of Chicago, Ill., have the contract for the entire machinery.

The opening of the Council Bluffs extension of the Chicago, Milwaukee & St. Paul Railroad has stimulated the building of new elevators along the line. Messrs. Beale Bros. & McDonald, of Bayard, Iowa, and D. Beale & Bros., Bagley, Iowa, are building elevators, and Thornburgh & Glessner, of Chicago, Ill., supply the machinery. J. Dull, contractor, is putting up elevators for parties at Perry and Coon Rapids, Iowa, which will both have elevating machinery from Thornburgh & Glessner, of Chicago, Ill.

A Paris paper says: "In the Southwest the work in connection with the harvest has been interrupted, in the centre and the North, which are almost wholly devoted to corn-growing, the violent storms have beaten down the best part of the corn fields—a fact which is of a nature to cause further prejudice not only to the quantity, but more especially to the quality chiefly of corn and oats. It is impossible to estimate as yet the extent of the damages, but what unfortunately is only too certain, owing to eight weeks inclement weather, the yield of our harvests will be inferior to that which was looked forward to last spring."

A suicide by drowning was witnessed at 4 o'clock A. M. September 2d by a switchman of the Illinois Central railroad, at the lake at the foot of Harrison street, in this city. After the plunge the switchman was unable to discover anything, and immediately gave the alarm. The body, recovered at 9 o'clock, was found to be that of a man of middle age. His pockets revealed that his name was Zenas Webster, and that his home was Brazil or Cold Bluff, Ind. Papers were also found indicating that he had been engaged in business with the Board of Trade commission men, and this, in the expressive phraseology of the guild, was the fruits of his "last deal."

Thornburgh & Glessner, Chicago, Ill., report numerous sales of their specialties for elevator repairs this season to parties as follows: The Chicago & Pacific Elevator Co., Chicago, Ill.; American Seed Co.'s Elevator, Chicago, Ill.; N. F. Parsons, Winnebago, Ill.; E. L. Wolf, Aledo, Ill.; N. H. Warner & Co., Earl, Ill.; G. H. Warner & Co., of Grafton, Neb.; New Orleans Elevator & Warehouse Co., New Orleans, La.; J. Thos. H. White, Spartensberg, S. C.; Bannhall & Welch, Marysville, Mo.; Wm. H. Green, Grundy Center, Ia.; Williams & Miller, Blue Mound, Ill.; Hall & Wilson, East Lynn, Ill.; J. H. Markell, Hayts Corners, N. Y.; Avery, Spaulgert & Co., Walnut, Ia.; Rhodes & Dayton, Amelia, Ia., and many others.

An important meeting of grain operators took place at Winona, Minn., on August 28d. There were present from out of town, G. W. Van Dusen, of Rochester; C. W. Seifield, of St. Charles; Sam Whitten, Rochester; Mr. Mace, Owatoma; Mr. Brown, of the Mazeppa Mill Co.; and S. G. Ayde and W. W. Cargill, of LaCrosse. The flouring mills and grain operators of Winona were represented. The object of the meeting was to discuss the handling of the present grain crop, and to agree as to prices at competing points on the railroads. Agreement was made as follows: Wheat is to be purchased at Milwaukee prices, less freight; barley as follows: No. 3 fifty cents; No. 4 forty-five cents; No. 5 thirty-five cents. No price was agreed upon for No. 2 barley. Some operators think that the crop is too large to be affected by such combinations.

The Iron Mountain Mill and Elevator at St. Louis, Mo., were destroyed by fire at about 4 o'clock a. m. of August 25th, the same night of the elevator fire at Buffalo, N. Y. The fire was accompanied by an explosion, and although an immediate alarm brought the fire engines within ten minutes, the rapidity of the flames prevented them from being of any avail, and the destruction was complete. Messrs. F. Tiedemann and Henry Buchler, Jr., composing the firm of Tiedemann & Co., the owners, erected these buildings about a year ago, very substantially, and had them thoroughly equipped. The elevator was 40x41 feet, nine stories high, the foundation being stone, the first story brick, and those above frame, and at the time of the fire contained about 6,000 bushels of wheat. How the fire originated is unknown. One observer, a watchman on a boat, says he saw lightning strike the elevator. Another explanation is that it was caused by spontaneous combustion and explosion of flour or elevator dust. The buildings were valued at \$130,000, and the stock of wheat and flour at \$20,000, with a total insurance of \$86,500. The work of rebuilding will be commenced at once.

The American Elevator

GRAIN TRADE.

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HARLEY B. MITCHELL, Editor.

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ADVERTISING.

This paper has a large circulation among the elevator men and grain dealers of the country, and is the best medium in the United States for reaching this trade. Advertising rates—made known upon application.

CORRESPONDENCE.

We solicit correspondence upon all topics of interest connected with the handling of grain or cognate subjects.

THE WELLAND CANAL.

The route by the Welland and St. Lawrence canals, now open to the shipment of grain and other agricultural products, though strongly advocated by many of our shippers for its eligibility, is already severely criticised as to its tolls and management. The old charges against Kingston reappear in a case of shipment of two cargoes of grain from Chicago, in which the duty was collected there on shortages amounting to about 40 bushels each. The amount, though small, represents an obnoxious principle of action, which will be resented, injuring the reputation and business of the route far more seriously than these unjust collections can repay. The name, "Robbers' Route," is already flaunted in bold type by some papers, and will be read and copied. The rates of toll on the Welland canal vary on vessels, according to the depth of draught, from 15 to 20 cents per ton. The rates for harbor tonage at each end of the canal are upon a sliding scale, from three cents for vessels under 140 tons (canal weight) to fifteen cents on those from 750 to 799 tons. Below Kingston are three heavy lockages on the St. Lawrence canal, at which it may be assumed that charges in proportion are to be made, rendering this route still more expensive. The conditions of successful competition for this great waterway, on which our ambitious neighbor has expended so many millions, are that sea-going vessels can, without breaking bulk, and at reasonable charges, convey their cargoes to the ocean.

THE WHEAT CROP.

Bradstreet's report of the wheat crop of 1882 sustains the current statement that it is the largest yet harvested in this country, being an increase over that of 1881 of 20 per cent. The report is based on 2,000 returns from the most important wheat growing sections of the country, and the result is due partially to an increased wheat acreage, but largely to an increased yield per acre. The yield of the Southern States for the present year is estimated at 48,500,000 bushels, an increase of 8,500,000 bushels over last year's production. The quality of the wheat of Illinois is much above the average, and of Dakota and Minne-

sota, it is said, will be in large proportion No. 1 grade. The latter State's acreage of wheat culture was diminished, but its yield per acre was unusually large. The wheat acreage of Ohio was about the same; that of Michigan was increased and promised well up to July 31, when excessively heavy rains occurred. The following table presents the wheat yield for 1882 by States. In Indiana the wheat was still in shock, and in Minnesota and Dakota just about to be threshed, which facts may, upon revision, modify these estimates:

Ohio.....	40,500,000	Missouri.....	30,000,000
Michigan.....	29,000,000	California.....	39,000,000
Indiana.....	46,000,000	Oregon and Washing- ton Territory.....	10,000,000
Kentucky.....	16,000,000	Southern States.....	48,500,000
Illinois.....	51,500,000	Middle States.....	39,500,000
Wisconsin.....	23,800,000	New England States.....	1,100,000
Minnesota.....	41,500,000	Colorado and Territo- ries.....	5,000,000
Dakota.....	12,000,000		
Nebraska.....	18,000,000	Total yield.....	526,400,000
Kansas.....	33,000,000		
Iowa.....	32,000,000		

THE CANADIAN CANALS AND OUR CARRYING TRADE.

The effects of the energy of the Dominion Government in improving her canals are already becoming apparent. During the present season ships loaded with 40,000 bushels of grain have been able to pass through the Welland Canal, which is nearly double the amount previously possible to such shipment, and the work is still incomplete. More than \$20,000,000 have been spent by the Government upon her canals since 1871. In this, the year of the adjustment of the Alabama claims, and of a reciprocal treaty between Canada and the United States, opening to the inhabitants of both countries on like terms the use of these water-ways, both natural and artificial, from the west to the seaboard, Canada decided to widen and deepen the Welland and St. Lawrence canals to the uniform depth of 12 feet. In 1875 this depth was increased to 14 feet, and work to this end is rapidly progressing; the most difficult part has already been done, and the time is very short when vessels may pass, from the western termini on the lakes to the Atlantic, of 1,200 tons capacity, laden with 60,000 bushels of grain. The distance from the mouth of the St. Lawrence to Duluth is 2,384 miles, of which 375 miles lie between Lake Erie and the seaboard, including about 71 miles of canals. The Welland starts from Lake Erie, 17 miles west of Buffalo, and at a distance of 27 miles empties into Lake Ontario at a point opposite Toronto. The work on this canal will be completed in about two years. Around the various rapids of the St. Lawrence are five canals varying in length, amounting in all to about 44 miles. The total height overcome by the 53 locks of these canals is 533½ feet. It is expected that the entire work of improvement of river and canals will be completed in six or seven years, when Canada, with a population of about 4,000,000, less by one million than that of New York state, will have spent upon her canal system a sum not less than \$50,000,000.

These facts should stimulate American enterprise in the same direction of opening our waterways to the seaboard within our own territory to vessels of equal capacity, with the alternative, if we do not, of losing largely our commercial importance and its fruits. The question of a "free canal" in New York must broaden into that of a ship canal; and this is perfectly feasible, not only by way of the Erie, but also by way of Lake Champlain from Lake Ontario to the Hudson River. In the matter of the safety of navigation to ocean vessels coming and going, New York has great advantages over the St. Lawrence, where the banks of Newfoundland, its fogs and icebergs are always to be dreaded, and often now lead Canadian shippers to prefer the more expensive routes by Portland or New York for the ship-

ment of their goods to the risks of their own. In such a competition there can be no comparison in the resources of the two countries. While the debt of the Dominion, now nearly two hundred million dollars, is steadily increasing, ours is rapidly diminishing; so that as our enthusiastic consul at Port Sarnia says: "Should congress deem it wise to suspend, for a single year, the usual decrease of our national debt, and apply the funds, which as a consequence would accumulate in the treasury, to the construction of a ship canal to the Atlantic, it is not probable that a further appropriation would be needed to complete it."

It is of interest to note here, in contrast with the naval armaments of the inland waters of the European continent, even in time of peace, that by treaty with Great Britain in 1817, it was agreed that the armed vessels on the lakes should not exceed three ships, each of 100 tons burden, for each nation. So, with no such heavy expenses to bear continuously, and in no fear of such an international conflict as now rages along the Suez canal, in peace and without fear, our commerce bears only her legitimate burden, and so moves on to her future conquests.

OUR EXPORTS OF BREADSTUFFS.

From the preliminary report of the Bureau of Statistics for the fiscal year ending June 30, 1882, we learn that the total value of the foreign commerce of this country during that period was \$1,561,859,456, and was less than that of the preceding fiscal year by \$108,164,862. The total value of the exports of domestic merchandise during the same time was \$733,073,937, showing a falling off, as compared with the preceding year, \$150,852,010. The report as to the various commodities for the entire year is not yet completed, but for the eleven months ending May 31st, the statement is as follows: The total value of the exports of breadstuffs was \$172,896,255, and was a falling off from the amount exported during the corresponding month of the preceding fiscal year of \$76,350,073. The falling off in the export of wheat, including wheat from this period, amounted to 57,959,566 bushels; of corn, including corn-meal, was 41,311,822 bushels. The crop season of 1881 showed a considerable decrease in the total production of seeds in the United States as compared with that of 1880. The total number of bushels of wheat raised in the season of 1880 was 498,549,868 bushels, while in 1881 it was 380,280,090, a decrease of 118,269,778 bushels, or 23.7 per cent. The number of bushels of corn produced in the crop season of 1881, was 1,194,916,000 bushels, which was a falling off from that of the preceding year of 522,518,543 bushels, or 30.4 per cent. During the same period the decrease in the crop of rye was 15.6 per cent.; of oats, 3 per cent., and of barley was 8.9 per cent.

Of the total value of exports of breadstuffs during the eleven months ending May 31, 1882, 81.45 per cent. was wheat and wheat flour, and 16.70 per cent. was corn and corn-meal, the two constituting 98.15 per cent. of the total exports of breadstuffs.

MESSRS. SNIVELY & MOLL, of Severance, Kansas, subscribe for the AMERICAN ELEVATOR AND GRAIN TRADE, and add the following: "We like the tone and get-up of the specimen copy you sent us, and trust you will keep it up to its present high standard. We heartily concur with the action of the grain buyers' convention at Shenandoah, Iowa, mention of which you made in your last issue. Our experience in St. Louis enables us to endorse those resolutions. You may send us the first number of your paper and date our subscription from that date."

THE EXPLOSION IN THE ERIE ELEVATOR.

We have received quite a number of letters of inquiry regarding the cause of the catastrophe in the Erie Elevator, all of them expressing some sort of mystification how an explosion was possible in a building devoted to such a purpose as it was—handling and storing of grain. Messrs. J. T. Moulton & Son, of this city, who built the elevator, write us: "We presume of course that you have noticed accounts of the loss by fire of the Erie Elevator at Buffalo. The circumstances attending it are novel to us, and we should like to know more about how the affair occurred, and trust that you will investigate the matter and give us an article in your journal in regard to it. The elevator mentioned was built by us in 1879, and we were quite proud of it. We have in our office a statement of Capt. C. C. Ricker, its superintendent, that during the week ending June 19, 1881, the elevator received 724,580 bushels, shipped to cars 529,167 bushels, shipped to canal boats 76,386 bushels, and to wagons 2,500 bushels. When you consider that in Buffalo all the grain is received through one dock elevator, from vessels and steamers, you will see that this dock elevator elevates an average of 5,000 bushels for every hour in the twenty-four for six successive days—a record which we think has never been equalled."

We think there can no longer be any doubt that the explosion in the Erie Elevator was one of those dust explosions which scientists have been investigating the past few years. Prof. Tobin, in his lecture before the underwriters in this city, on September 6, conclusively showed that grain dust was as explosive and inflammable as flour dust, when in suspension in the atmosphere, in a confined space, and brought in contact with a light. The measures to be adopted to prevent such catastrophes, are first, to keep the building as free as possible from dust, and second, to prohibit the use of exposed lights. Knowing the cause and conditions of such explosions, it is comparatively easy to guard against them.

EIGHT British and one German steamship cleared from the port of Baltimore, Md., on August 31, with full cargoes for France, Great Britain and Germany. Among the exports were 843,100 bushels of wheat, the largest quantity ever shipped from that port in one day.

AGAIN we send out a great number of sample copies of this journal to grain dealers and others interested in the trade. We are determined that our constituency shall have a good opportunity to decide upon the merits of this paper. And right here we may remark that this journal is no longer an experiment. It has come to stay. Subscribe for it. We will guarantee to benefit all who subscribe, more than the value of their subscription.

THAT figures do "lie," when presented by correspondents whose enthusiasm surpasses their knowledge, is shown often, and especially in times like the present when the eyes of the world are eagerly scanning grain statistics, even in our special trade journals of special type. A writer in one of these papers in the East says that the oat crop of Dakota and Minnesota have a yield sometimes of 90 bushels per acre, and the average will not be less than 60 bushels. An average of twelve years ending 1880, in the State was $32\frac{1}{2}$ bushels per acre, and in 1878, an unusually prolific year, the crop only reached an average per acre of 38.65 bushels. The descriptions of grains, and the handling of percentages in these conservators of statistical wisdom present many valuable specimens of *reductio ad absurdum*.

Editorial Mention.

THE activity in elevator building all through the Northwest continues.

WE want grain men to write to us on any matters of interest in regard to the trade.

PHILIP H. GILL, of Brooklyn, places us under obligations for a catalogue of his grain handling and flour mill specialties.

As we predicted, the settlement of July wheat contracts in this market was not effected without trouble, if an appeal to the courts can be said to be a settlement at all.

SEND us any items of news respecting new elevators being built or old elevators being refitted or putting in new machinery. We want our page of "Elevator News" to grow.

WE are informed by a correspondent at Kansas City that the pneumatic elevator recently put up in that city was not a success, and the ordinary system has been put in instead.

CHICAGO is a pretty "rapid" place; and we doubt if grain was ever sold as fast as it was one day last week, when 3,500,000 bushels of corn were sold on call within thirty minutes.

THE *Baltimore Journal of Commerce* in its issue of Sept. 2, excelled its own excellent self. It appeared with forty-eight pages full of meaty matter and abounding in evidences of a deserved support.

THE Crescent Mill and Elevator at Denver, Col., burned the morning of Sept. 12. The mill and elevator were the largest in the state and were full of grain. The loss was \$225,000; fully insured.

MR. R. A. MCGOWEN, one of the proprietors of the Farmers' Elevator, at Indianola, Iowa, in subscribing for our journal, writes us: "In your issue of August 15 you give elevator men good advice in regard to grain dumps. I put in the first straight single beam dump for J. A. Funk of Prairie City, McDonough Co., Ill., in 1866. Previous to that time the entire platform was movable. The rests, stirrup and lever cut-off are mine, but were not patented by me."

GRAIN dealers, commission men, millers, and all who are interested in obtaining reliable information in regard to our cereal crops, should not fail to read the announcement made elsewhere in this number under the caption of "Important to Grain Men and Millers." The Aultman & Taylor Co., of Mansfield, Ohio, have rendered all concerned a valuable service by organizing their thousands of customers into a crop report bureau, and we have no doubt the movement will meet with suitable encouragement. Read the card.

It has already become trite to say that our present harvest is exceptionally abundant and surpasses our highest anticipations. A comparison of values among the products of different industries, and at different periods of time, rightly appreciated, can hardly fail to stimulate large numbers of those seeking a field for their life's work, to that of agriculture. Not only have the advances in scientific knowledge and improvements in machinery lessened the labor, and added to the productive power of the farmer, but the value of those products have increased in at least an equal ratio. In the second decade of the century wheat brought from 25 to 40 cents per bushel; it now brings

from \$1.00 to \$1.40. Corn then ranged from 12 to 20 cents a bushel, while a bushel now sells at from 40 to 80 cents. Oats have increased in value from 15 cents to from 40 to 50 cents per bushel. And the same relative increase pertains to the remaining agricultural products. Meanwhile, greatly increased means of transportation are furnished at a diminished cost; while the infinitely multiplied fruits of manufacture and of art have decreased apparently to a much greater proportionate extent, in cost.

THE PORTER IRON ROOFING Co., of Cincinnati, Ohio, claim the attention of our readers in their card published elsewhere in this journal. It is hardly necessary to argue the great value of iron roofing and siding for buildings of almost every character, as that is now very generally conceded. The establishment in question is the largest manufacturer of sheet iron roofing in the country, and their business extends to every state and territory. They publish an illustrated catalogue of their goods which interested parties can obtain by making application for it.

ATTENTION is directed to the advertisement of Messrs. Chas. Kaestner & Co., of this city, which will be found in our columns this issue. Messrs. Kaestner & Co. have been in business nearly twenty years, in which time they have sold several thousand of the Kaestner mills (for flour and feed), and built up a large business in their other specialties and general machinery. They have issued an illustrated catalogue of the various machines they either make or handle, a copy of which they will send on application. The address of Messrs. Kaestner & Co. is given in their card.

AFTER a long period of reflection the Canadian Minister of Customs, Mr. Bowell, announced some weeks since that duty would not be hereafter demanded upon "shortage" of grain shipped by water in transit, provided, that by the affidavits of the officers in charge of the vessel it is shown that bulk was not broken during the voyage. This, which it would seem ought to be an end of this grievance, was, however, for a time complicated by technical peculiarity of Mr. Bowell in refusing to receive such affidavits if simply worded "to the best of our knowledge and belief." As this as a matter of positive knowledge was not possible to the captains the required forms were refused. The minister at length yielded as to the canals but still continues the requirement on the lake shipments. This is simply petty and foolish. The voice of public opinion will again compel him to succumb.

SOMETHING NEW UNDER THE SUN.—At the Chicago Exposition this year Mr. H. W. Caldwell, of 46 South Canal street, this city, well known as the patentee of the Caldwell Conveyor, has an exhibit which attracts as much or more attention than any other one article in the mechanical department. It is an eight-inch Caldwell Screw Conveyor, *elevating grain vertically*. We do not know that a conveyor has ever before been thus used as an elevator; but Mr. Caldwell has demonstrated its feasibility, and shows such a conveyor in actual operation. This vertical conveyor is enclosed in a metallic spout and may be driven either by belt or gear. He informs us that there is practically no limit to the height to which this unique elevator may be made to operate, while its capacity is immense. The range of uses to which such a contrivance may be put will readily occur to the reader. Mr. Caldwell certainly has something new. It is covered by letters patent and we wish him success in its introduction to the industrial world.

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Commission Merchants125 La Salle Street,
Adjoining Chamber of Commerce, **CHICAGO.****Grain, Seed and Provisions.**

Consignments of above solicited, and Orders for Purchase and Sale for Cash, or Future Delivery on Margins carefully executed.

Facilities Unsurpassed. Satisfaction Guaranteed.

Special Correspondence regarding Markets freely furnished upon request.

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TRIMBLE & CO.,
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Careful Attention given to Filling Option Orders.

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14 S. HALLIDAY ST., BALTIMORE, MD.Citizens' National Bank, Baltimore; Mechanics' National Bank, Baltimore; Jno. A. Hamilton & Co., Bankers, Baltimore.
WANTED—Responsible parties to solicit grain for us in the West. Liberal Commissions.**GOODRIDGE, FIELD & CO.**
GRAIN AND FLOUR,**NORFOLK, VA.**

Business attended to at New-Port News, (Eastern Terminus C. & O. Railroad.)

CHAS. KAESTNER & CO.

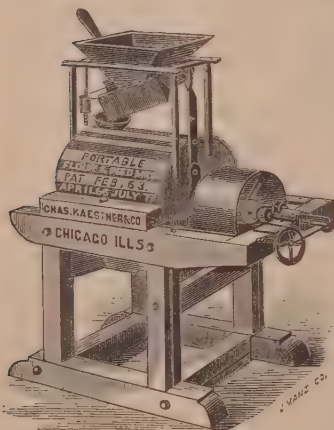
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General Machinery.SHAFTING,
PULLEYS,
HANGERS and
GEARING
A SPECIALTY.

Over 4,500 of our Mills in use.

Sold under a full guarantee to give entire satisfaction or money refunded. Parties erecting Elevators will consult their own interests by sending for our illustrated Catalogue and references.

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303 to 311 So. Canal St., CHICAGO.
74 to 98 Harrison St.,**BOOKS ON STEAM POWER.**

We will send any of the following named books postage free on receipt of annexed prices.

Roper—A Catechism of High Pressure, or Non-Condensing Steam-Engines: Including the Modeling, Constructing, and Management of Steam Engines and Steam Boilers. With valuable illustrations. By STEPHEN ROPER, Engineer. Thirteenth edition, revised and enlarged. 18mo., tucks, gilt edge. \$2 00**Roper—Handbook of Modern Steam Fire-Engines.** With illustrations. By STEPHEN ROPER, Engineer. 12mo., tucks, gilt edge. \$3 50**Roper—Use and Abuse of the Steam Boiler.** By STEPHEN ROPER, Engineer. Fifth Edition, with illustrations, 18mo., tucks, gilt edge. \$2 00**Roper—Engineer's Handy Book:** Containing a full Explanation of the Steam-Engine Indicator, and its Use and Advantages to Engineers and Steam Users. With Formula for Estimating the Power of all Classes of Steam-Engines; also, Facts, Figures, Questions, and Tables for Engineers who wish to qualify themselves for the United States Navy, the Revenue Service, the Mercantile Marine, or to take charge of the Better Class of Stationary Steam-Engines. Second edition. 1 vol. 16mo., 675 pages, tucks, gilt edge. \$3 50

It contains nearly 300 Main Subjects, 1316 Paragraphs, 876 Questions and Answers, 52 Suggestions and Instructions, 105 Rules, Formula, and Examples, 149 Tables, 195 Illustrations, 31 Indicator Diagrams, and 197 Technical Terms; over 3000 different subjects, with the questions most likely to be asked when under examination before being commissioned as an Engineer in the U. S. Navy or Revenue Service, before being licensed as an Engineer in the Mercantile Marine Service, or receiving a certificate to take charge of a steam-engine or boiler in locations where such certificate is necessary. There is not a subject within the whole range of steam-engineering on which it does not treat.

Roper—Questions and Answers for Engineers. This little book contains all the questions that Engineers will be asked when undergoing an examination for the purpose of procuring licenses, and they are so plain that any engineer or fireman of ordinary intelligence may commit them to memory in a short time. By STEPHEN ROPER, Engineer. \$3 00

Address, MITCHELL BROS. CO. 184 and 186 Dearborn St., CHICAGO, ILL.

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GRAIN RECEIVERS**Commission Merchants,**Nos. 122 and 124 Washington Street,
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Solicit Consignments and Orders for Future Delivery.

ESTABLISHED 1866.

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Grain and Flour Agent,
ANTWERP, BELGIUM.

References and Cable Codes Furnished.

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General Commission Merchants

Room 28, Metropolitan Block, Chicago.

Refer by permission: B. L. Smith, Cashier Hide and Leather National Bank, Chicago, Ill.; Col. E. A. Bowen, President First National Bank, Mendota, Ill.; Chas. C. Macy, Cashier Farmers' National Bank, Hudson, N. Y.; Wm. Seymour, Cashier First National Bank, Hudson, N. Y.; Fred'k Hill, Cashier Tanners' National Bank, Catskill, N. Y.; or O. P. Collier, President First National Bank, Battle Creek, Mich.

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These Companies co-operate throughout the Northwest, employing the same inspectors and dividing expenses. Are purely mutual; all assets are owned and controlled by the policy holders. All risks carefully examined by salaried inspectors, and rated on fixed schedules, thereby avoiding unjust apportionments. Experience has proved properly conducted Mutual Companies to be the safest and most economical.

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We take pleasure in referring to the following well-known mill owners and firms, members of this Company:

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Polar Star Mill Co., Polar Star Mills, Faribault, Minn.

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EXCELSIOR
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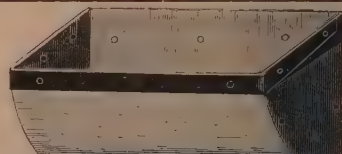
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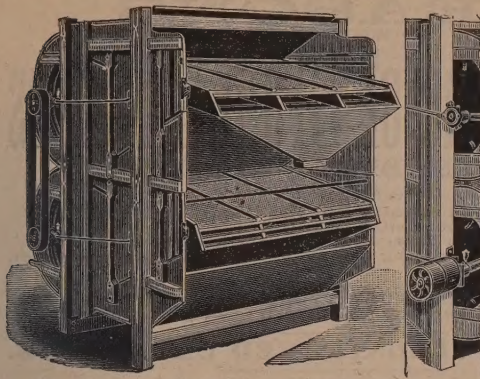
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Improved Elevator Machinery,Including Pulleys, Shafting, Hangers, Journal Boxes,
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Double "End Shake" warehouse and elevator mill. Made in three sizes. Capacity from 400 to 600 bushels per hour. No other Mill Like, or Equal to it in the World.

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**FANNING MILLS
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Both single and double and with either "s de shake" or "end shake." Made in fifteen sizes. Mills of any capacity, from 60 to 600 bushels per hour.

These mills are guaranteed to be superior in all respects to any other manufactured in America. Prices made right.

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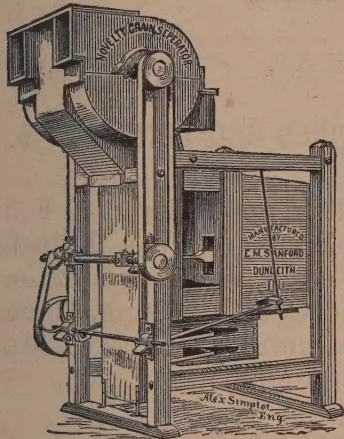
IMPROVED STEAM SHOVELS

For Unloading Grain from Cars,

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ESTIMATES FURNISHED ON APPLICATION.

**NOVELTY
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SPECIAL FEATURES.

Seamless Round Corners, Shovel Edge, Curved Heel, Carries More, Runs Easier, Empties Clean, Lasts Longer, is nearer Perfection than any other bucket made.

WHAT USERS SAY OF IT.

We are much pleased with the "Salem" bucket—have over six thousand in our mill, and pronounce them the best we ever used.

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We consider the "Salem" the best in the market. What better testimonial can you have than the size and frequency of our orders?

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Your "Salem" buckets are satisfactory in every respect. Shall want more soon.

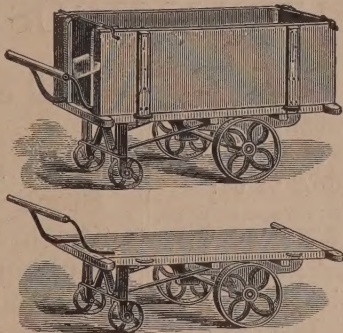
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We have over four thousand "Salem" buckets in our Patapasco Mill B, and they are giving entire satisfaction. We think they are the best bucket in the market.

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**THE REYNOLDS
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Ten Reasons why the Reynolds Improved Truck is the Best in use.

1st. It is the simplest, strongest, and most efficient.

2d. It can be loaded, weighed and unloaded with one handling.

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4th. One man can handle from 1,200 to 1,800 pounds on it, easier than one-third the amount on any other truck.

5th. It occupies less space, according to capacity, being so arranged that it turns in exactly its own length.

6th. It will dispense with the services of one man in any mill, warehouse or store, where business enough is done to keep it in use.

7th. With the box it will carry grain, feed, meal, and all kinds of offal, and other merchandise in bulk.

8th. Without the box it will carry flour in sacks, flour, feed, and offal in bags, and other merchandise in bags, boxes, parcels or bales.

9th. Its wearing parts are all iron, turned to a standard gauge, and any part can be duplicated on short notice in case of accident or breakage.

10th. It has a wider range of uses, and is better adapted to meet all the wants of millers, warehousemen and merchants, than any other truck in use.

For information, address

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ONLY ONE DOLLAR PER YEAR

Address **MITCHELL BROS. Co., 184 & 186 Dearborn Street, Chicago.**

Important to Grain Men and Millers.

EDITOR AMERICAN ELEVATOR AND GRAIN TRADE, Chicago, Ill.

The demand for reliable information in regard to the principal cereal crops—wheat, oats, and corn—is evidently increasing, and knowledge of the same diffused throughout the world will unquestionably have a steady effect on the markets, especially as "time is no more," so to speak, with telegrams and telephones from all parts of the earth at hand with the morning meal. The U. S. Government, with its six thousand correspondents, is doing more than is fully appreciated in this system of crop reports, but many of these emanate from professors in colleges, physicians, retired merchants and others of a very intelligent class, but too far removed from the practical source of information. It is, therefore, a very important move which is just now being made by the Aultman & Taylor Company, of Mansfield, Ohio, in organizing their ten thousand customers into a Crop Report Bureau, who will regularly send in their actual figures, showing the acreage of wheat, oats, and corn growing, and as compared with the previous year; condition of the same as compared with previous month and corresponding month of previous year, and in the threshing season will give the actual figures from their books, showing the result, and as compared with previous year's threshing.

It is evident that such figures will be reliable and valuable as a basis for calculations.

The reports will be published in neat pamphlet form, and copies of the September report may be obtained on application, mailed to any post-office in the U. S., on receipt of one dollar. Address, **CHARLES F. HARDING,**

Mansfield, Richland Co., Ohio.

N. B.—American millers and grain men will be supplied with the September report for one dollar, while English and Continental applicants will be charged £1 (four dollars and eighty-three cents.)

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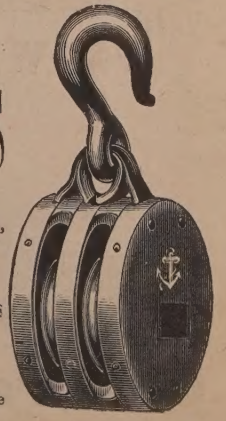
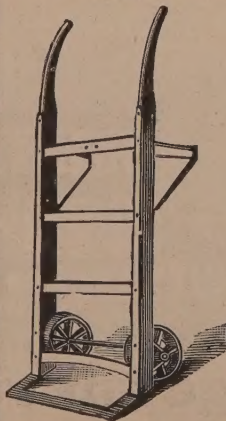
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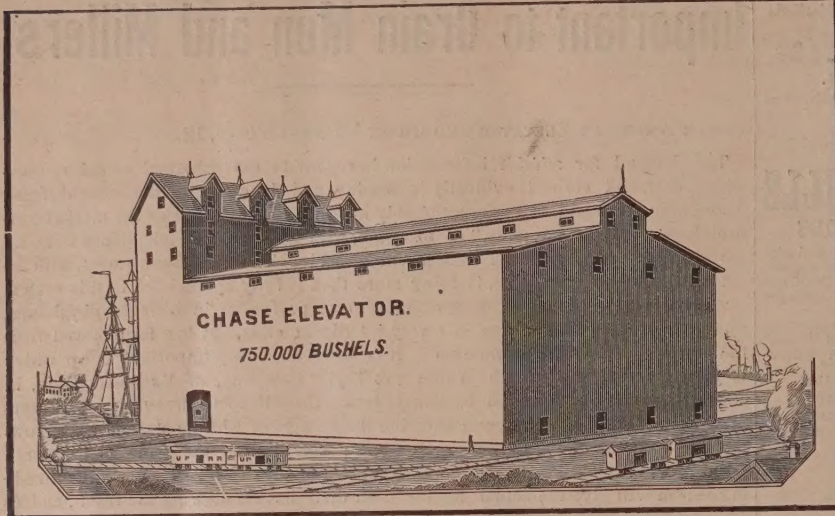
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WRITE for ILLUSTRATED CATALOGUE.

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99 & 101 WASHINGTON STREET,
CHICAGO.

The accompanying cut will be changed in the next issue of this paper, and another style of building shown.

CHISHOLM BROS. & GUNN,

Elevator and Mill Builders,

AND GENERAL SUPPLY HOUSE.

We are now prepared to Build and Equip in the most thorough and complete manner, MILLS OF ANY CAPACITY, employing either

JONATHAN MILLS'
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Roller Machines,
Or on Systems Employing a
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We Refer to the Following Mills

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Lake City Mills	Lake City, Minn.
Bridges & Johnston's Mill	Crete, Neb.
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LaGrange Mill	Red Wing, Minn.
Stillwater Mills	Stillwater, Minn.
Golden Gate Flour Mills	San Francisco, Cal.
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We shall keep on hand a Full Stock of Dufour & Co.'s Bolting Cloth, Plated Wire Cloth, Leather, Rubber and Cotton Belting, Elevator Buckets and Flour Mill Machinery generally.

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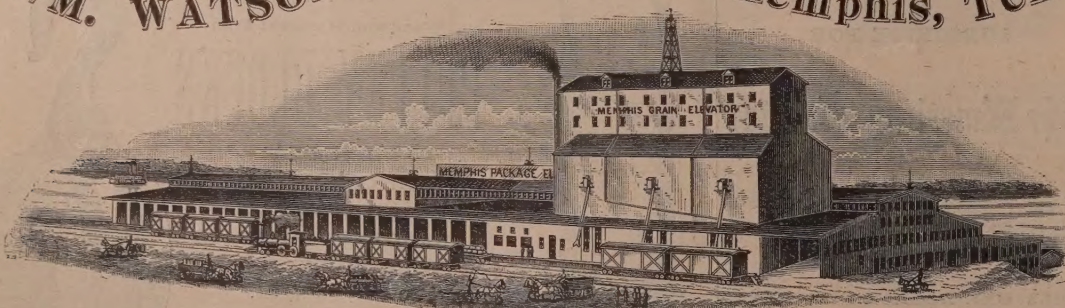
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Superior to all Others for Service and Economy

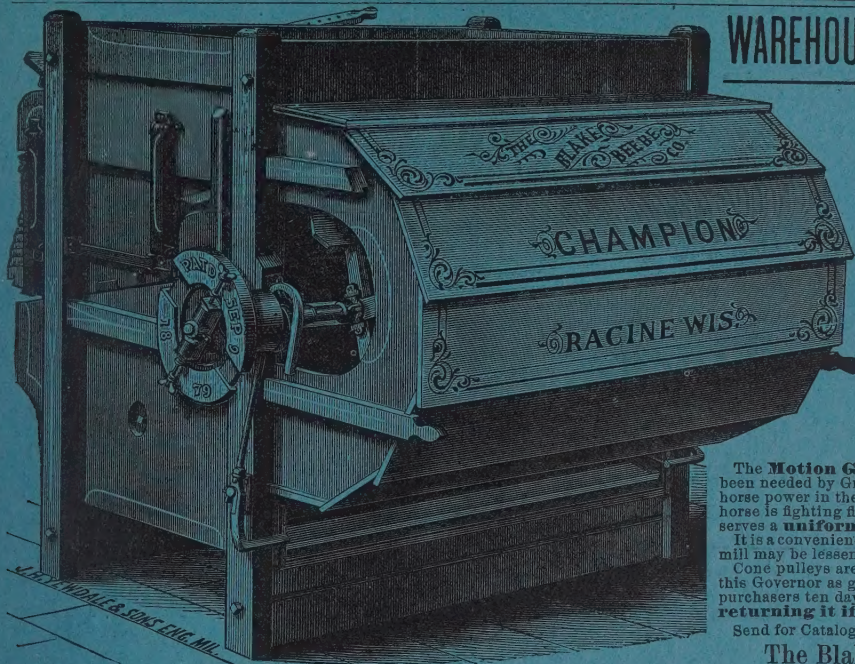
Twice as Strong as Leather.

ANY LENGTH

Send for Reduced List and Discounts. Over 2,000,000 feet sold during 1887.

NORDYKE & MARION CO.,
Indianapolis, Ind.

AMERICAN ELEVATOR AND GRAIN TRADE.



WAREHOUSE FANNING MILLS.

Cut of No. 6 Mill with Motion Governor.

**CAPACITY,
600 BUSHELS
PER HOUR.**

**WE MAKE
Seven Different Sizes
—FOR—
WAREHOUSES
& ELEVATORS.**

The Motion Governor is something that has long been needed by Grain men, particularly by those who use horse power in their elevators, for it matters not if the horse is fighting flies, jumps or runs, this Governor preserves a uniform and steady speed. It is a convenience with steam power, as the speed of the mill may be lessened or accelerated by it in a moment. Cone pulleys are unnecessary with it. We guarantee this Governor as good as represented, and we will allow purchasers ten days to test it, with the privilege of returning it if not equal to the guarantee.

Send for Catalogue to

The Blake-Beebe Co., Racine, Wis.

KERFOOT BROS.,

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**General Mill Furnishers
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ELEVATOR SUPPLIES.**

Full Line in Stock of

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Portable Mills, Corn Shellers, SEPARATORS, WIRE CLOTHS, and of such sundries as are generally used in Elevators or Mills.

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Automatic Corn Sheller.

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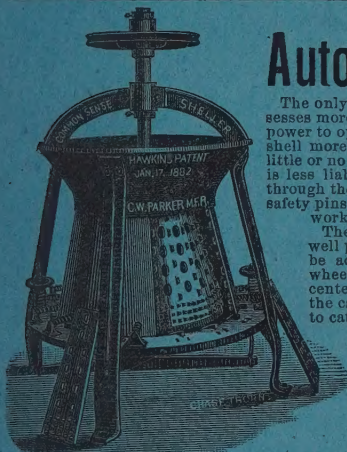
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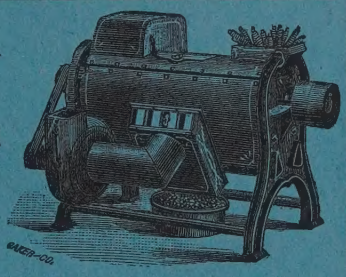
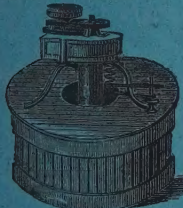
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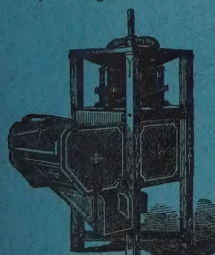
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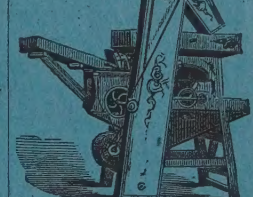
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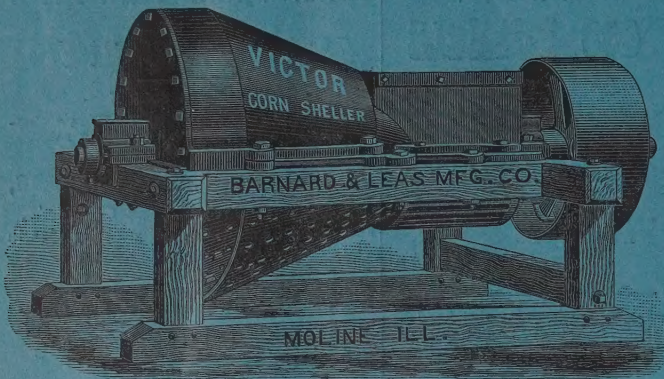
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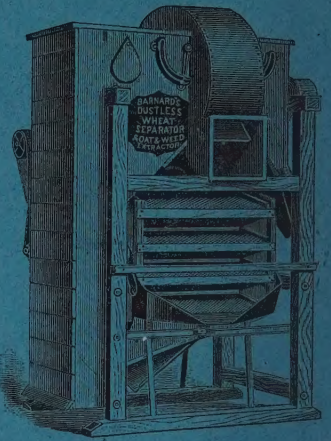


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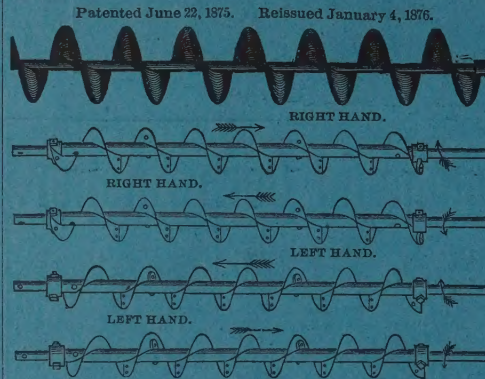
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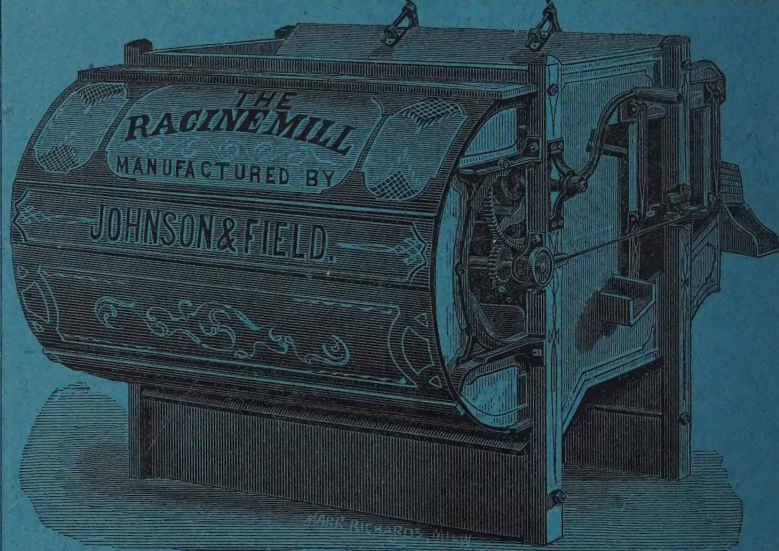
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